Nature Lore of Owasippe

NATURALIST

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1953

PREFACE TO OWASIPPE NATURE LORE MANUAL

Perhaps the Naturalist using this book had best be warned before he gets too far into it, that this manual is not a reference book or an authoritative technical source of material. It is merely a guide to the Nature Lore of the Michigan forest around Owasippe. The various lists of birds, flowers, trees, etc., to be found in it are quite accurate, however, and have been checked by several observers. With each subject will be found one, two or more references, which we believe are very good, and the use of which we would recommend.

In approaching the subject of Nature Lore, a Naturalist should not only take into account the putting across of technical knowledge on a more or less technical subject, but should first ask himself just what the boy should get out of the study of Nature. It seems to us that the three most important things are:

1. Appreciation and love of Nature;
2. A knowledge and appreciation of his duty as a citizen helping in the preservation and conservation of wild life; and
3. A more or less technical knowledge of the subject.

You will notice that the technical knowledge comes last! If we, as Naturalists put No. 3 in first place, a few boys will become intensely interested and will perhaps go on to become pretty fair naturalists themselves, but if we keep No.1 in first place, Nature Lore is going to be fun for the boy. More boys will become interested and the boys that would naturally take to the technical knowledge will get it anyway.

If we point out a tree and say to a boy, "That's a Quercus Alba," the boy's perfectly proper answer might be, "So what?" But if we say, "That's a white oak tree. Its wood is used in ship-building and for furniture, and there are tribes of western Indians who filter the tannin out of the flour made from its acorns and use the flour for bread," the boy is immediately interested. That is something he might have to know sometime if he were ever lost in the woods or had to live with the Indians. Never underestimate a boy's imagination.

Boys want to know about Nature, but we so often let the technical side of the thing carry us away, that it becomes work for the boy, whereas it should be fun. The proper twist or angle, or approach -- or sugar-coating, if you please -- is the most important thing in getting a piece of Nature Lore over to the boy. If you want him to learn flowers, don't give him merely their names but tell him what the Indians did with those flowers and what our pioneer ancestors did with them. The same thing holds true for trees. Birds are easier to teach because they move and each bird has its own peculiar beauty, but remember the most important fact about a bird is not that it is so many inches long; tell him rather to compare the bird's size with the size of some more familiar bird. Animals can be taught by the use of photographs and catch-a-live traps, which the boys can make themselves.

You have probably noticed that the words "Nature Study" have been sparingly used in the preceding paragraphs. After all, the boy doesn't come out to camp to go to school, and naturally anything that smacks of "study" to the boy means nothing more nor less than school. Wouldn't Nature Lore be a better term?

In order to make Forestry more attractive to the boys, perhaps the Forestry Group could be made the Fire-Fighting Crew of camp, with a box of fire-fighting tools marked with red paint out in back of the mess hall.

The Conservation Group might be made "Trouble Shooters" for the health of the forest, that is, wherever there is an outbreak of insect pests, the Conservationists could officially and ceremoniously, be designated to put the insect pests under control.

Both Foresters and Conservations could be used in tree repair.

The establishment of a good camp museum is of utmost importance. It is the bait with which we catch the boys' interest in Nature Lore. It should be attractive, of course, and as simple and complete as possible. Beware, however, of a collection of junk. Incidentally, the boy who makes a contribution to the museum this year will most certainly come back next year to see it.

Evolution can be put over quite painlessly by use of "The Trail of Life Table" — a marked trail on a table showing the development of life from lowest to highest forms with specimens — sponges, bones, feathers, etc., as illustrations.

One of the most successful methods this writer ever used to put across Nature Lore at camp was the "Exploration" trip. The camp would be told that a limited number of boys would be allowed to go on a trip to such and such a place (with a very vague, but as exciting as possible, description of the place). Then the boys would be taken out and "incidentally and accidentally" the facts of natural history would be poured into them all along the trail.

Perhaps the best trip is a real Adventure Hike, wading up the Trout Stream from the Incinerator Road to the Headwaters. Several successful early morning bird hikes were taken over to examine the "graves" near Stubby's Folly, on the other side of Austin Lake. Something special might be a one or two day canoe trip on Silver Creek, from the bridge at Schneider's Farm down to the Spillway. A starvation hike, where the boys "live off the country," is also full of adventure.

A Nature Trail, or perhaps several of them, should be established around camp with permanent markers prominently displayed. One type of marker to be tried at Camp Dan Beard this summer (1936) is extremely simple. It is a tin disc about four inches in diameter with the lower three-quarters white and the top quarter red. On the white area, the necessary information will be printed in India Ink, and then the whole marker will be dipped in shellac or lacquer. These markers are durable and should last for quite some time.

In conclusion, may I again repeat that this book is not intended to be anything more than just a guide. If you, as Naturalist, can add bits of information to it, they will be sincerely appreciated by the writer. May I express my thanks to Charles Hoffmeister, Al Weber, Harvey Blank, Peter Kukelski, and others who have in one way or another helped me in this preparation.

Ernest F. Schmidt
June 20, 1936

FISHING

To obtain a Merit Badge for Fishing, A Scout must:

1. Catch three different kinds of fish by any legal, sportsmanlike method and identify them. (One of the fish must be taken on an artificial lure using any type of rod.) Clean properly for cooking.

2. Identify the different parts of a fly rod, or a casting rod, or a salt water rod, or a spinning rod; and the main parts of a fly, or casting, or salt water, or spinning reel; OR, show how to take care of your fishing tackle so that it will remain in good condition for the longest period of time; OR, tell where the chief kinds of fish are likely to be found in your area, at different times of year, different times of day, in different kinds of weather.

3. Catch and identify three kinds of live bait.

4. Give the open seasons on game fish in your area and explain how and why they are protected by law.

FISH FOUND AROUND OWASIPPE:

Small Mouth Bass
Large Mouth Bass
Rock Bass
Wall-Eyed Pike
Northern Pike - Pickerel
Grass Pike - Pickerel
Perch
Sunfish
Brook Trout
Rainbow Trout
Brook Trout
Brown Trout

FIRST PRINCIPLES OF FLY CASTING

By Ozark Ripley

Many angling authorities concede that fly casting is very simple in its principles and is much easier to learn than bait casting. Its motions, at least, are exceedingly simple and may be learned in a few minutes by anyone who will devote a thorough study to the accompanying illustrations.

A practical fishing rod for the novice is nine feet in length. It should be made of split bamboo and weigh in the neighborhood of 5 $\frac{1}{2}$ ounces. On the fly rod the reel is seated below the hand-grasp or cork grip, as differentiated from the bait casting rod where the reel is above the hand-grasp. The reel is the one narrow arbor type, as indicated in the illustrations. Theoretically the reel should weigh about one and one-half times the weight of the rod. Proper balance of reel, rod and line is important in "harmonious" casting. Of great importance is the line, for, it is the line and not the fly that is cast. In fly casting the reel does not turn, it remains motionless except when the line is pulled from it with the left hand. The fly or lure at the end of the line matters virtually nothing so far as the casting is concerned. The line must be heavy enough to develop the pwer in the rod. That is, bend the rod so that in resuming its normal straightness, the rod may exert pull on the line which helps to start it travelling into the air behind and above the caster on the back cast -- and out again over the water in front of him on the forward cast.

You may practice on the lawn of your back yard just as well as on the water, and a little better. But in case you cast on the water dress your line with Oreno Line Dressing which will prevent the line from sinking.

A size "D" level fly line, or even a size "C" will usually be found proper for a rod of the above general specifications. Roughly speaking, the whippier or the more limber the rod, the lighter the line that may be used, and vice versa.

Figure 1

Figure 1 - For assembling the rod, joint the middle and tip first. Then match the butt joint. Be sure that all guides are in line. If ferrules are hard-fitting, a little oil may be used.

Figure 2

Figure 2 - Set reel on butt of rod with handle of reel on right hand side and guides and reel on under side of rod. The majority of South Bend rods have locking reel seats, which keeps reel in tight position at all times.

Figure 3

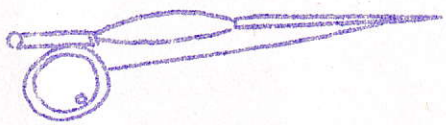


Figure 3 - Assume the line has been wound on reel. The line sould be drawn through the first (or stripping) guide. Of course the line follows through the remainder of the guides and the tip on the rod.

Figure 4

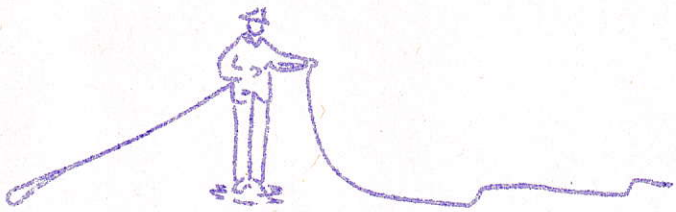


Figure 4 - Draw off about 20 ft. of line from the tip of the rod. The distance from the end of the line to the butt should be about 30 feet. Stretch the line out straight from the tip of the rod. A 30 foot length is practical for the novice. It is a good fishing distance and enough to develop the power of the rod.

Figure 5

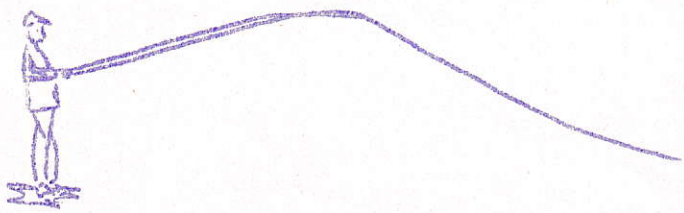


Figure 5 - With the line lying straight out in front of you on the grass, pick up the rod by the cork grip, using the right hand as indicated in the sketch. With the thumb and finger of the left hand, grasp the line between the reel and the first rod guide at a point approximately as shown in Figure 6.

Figure 6 - Hold the line with the rod tip slightly elevated. The hand grip is firm, the thumb on top and extending along the grip, and the elbow, close to the body. It is important that the elbow remain in this position.

Figure 6

Figure 7 - The back cast means that, by a smart upward twitch of the rod, the line lying out in front of the caster will be picked up and propelled upward and backward over the caster's right shoulder. A high back cast is important. Process: With a a quick upward snap of the wrist, which brings the forearm into play secondarily, bring the rod tip upward toward the right shoulder, leaning the rod slightly to the right of the point of the shoulder. During the upward snap, the weight or feel of the rod will be in a pressure against the two first fingers of the right hand curled underneath the cork grip, with a downward pressure exerted by the heel of the hand. Check the rod sharply when it reaches a point just beyond or back of the perpendicular. The power or spring of the rod, plus the elasticity of the line will propel the line upward and backward.

Figure 7

Egure 8 - The pause, as it is called, is an important phase in fly casting. It starts when the rod is checked in its back casting operation. It ceases at the instant the point of greatest backward tension of "live" line is reached, as determined by the feeling in the rod tip. This point will be somewhere before the line has straightened out above and behind the caster. Determining this point is an important principle in fly casting. At the beginning it will help to count: "One!" back cast. "Two!" the line moves up and back. "Three!" tension point is nearly reached. "Four!" tension point is reached and the forward cast begins instantly on the count of four. Space the counts at a little less than a second apart and wait until the fourth count before starting the forward cast. (The left hand remains as before - holding the line between the first guide and the reel).

Figure 9 - Start of forward cast: In "feeling out" the point of most backward tension on the line. The rod has moved very slightly forward which virtually constitutes the beginning of the forward cast, because there is no pause between this feeling out and the downward stroke of the forward cast. This feeling out of the tension of the line makes it look as if the forward cast were started slowly which is virtually what happens, but is finished very snappily. The rod tip describes a swift and shippy downward arc, and the thumb on the upper surface of the cork rod grip exerts powerful forward and downward pressure. In its downward arc, it was checked. The angle for the point of checking in the forward cast is shown in Figure 10.

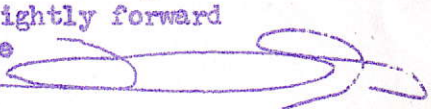


Figure 10 - As the rod is checked the line, of its own life and momentum, continues on in its straightening of the rolling loop it has described in the air. While the line is still "live," that is, pulling forward, releasing the left hand entirely from its grip on the line, and the extra line between hand and reel will "shoot" through the guides, while the line falls gently to the surface of the water or the grass. (In actual fishing, never release the line entirely from the left hand because you are liable to get a strike when the fly lands. Having the line in the hand permits hooking the fish). From this point, if the line now lies reasonably straight before you, start and complete the process all over again.

Figure 10

These in brief are the first principles of fly casting, and with a little practice, a reasonably fair line may be laid. Try it!

FUNDAMENTALS OF BAIT CASTING

By Ozark Ripley

Each year finds a vast army of fishermen, who have been accustomed to fishing only with a cane pole, turning to the bait casting method of angling because of the increased sport, thrills and joys experienced. Each of these fishermen is confronted with many questions, those seemingly foolish to the old-time angler but of paramount importance tothe beginner.

The necessary equipment for a bait caster consists of a rod, reel, silk line, leader and as many lures as desired. To enjoy bait casting to its fullest extent a split bamboo rod is recommended, first because it is lighter and second becuase its resiliency or action carries the feel of the dashes and leaps of a fighting fish direct to the fisherman.

ASSEMBLING THE ROD

Split bamboo bait casting rods are generally made in two sections. A ferrule is carefully fitted to each section of the rod. It is well to oil these ferrules occasionally in order to insure their fitting perfectly. When putting these ferrules together to assemble a rod, always make certain that the guides line up.

The next step is to place the reel on the rod. All South Bend reels are level-winding and anti-back-lash. The advantage of an anti-back-lash reel is that by a simple adjustment, it can be used proficiently by an amateur. The mechanism operates automatically -- the beginner can cast as well as an old-timer following a few minutes practice. Level-winding devices wind the line evenly and smoothly on the reel.

PLACING REEL ON ROD

Each reel is fitted with a clip. This clip fits into the reel seat on the rod. When holding the rod with the guides up, the reel should be on top of the rod. The line then travels from the reel directly through the line guides on the rod. Locking reel seats, used on South Bend rods, when tightened prevent the reel from twisting or working loose. The next step is to put the line on the reel. An 18-pound test bait casting silk line is generally sufficient for ordinary fishing. First take a cheap or old line and wind 20 or 30 yeard on the reel. This serves as a filler and the advantage of using it is that it is then not necessary to use more than one 50 -yard spool of first quality line. This "filler" line seldom leaves the reel when casting and therefore need not be an expensive one.

WINDING LINE ON REEL

Then add 50 yards of good silk line. Black Oreno is one of the finest casting lines made, and with proper care will render long service. The line should not become twisted when wound on the reel. A good way to wind the line from the spool is to push a pencil through the center of the spool and then place the ends of it between the knees. Put the loose end of the line through the top guide of the rod and then follow on down the rod through the other guides to the reel. Tie the line to the filler and wind the line on the reel. It is advisable to use a 6 or 9 inch cable wire leader on the loose end of the line. These leaders serve two purposes. First it prevents the fish from cutting the line and second it is much more convenient to change lures, as a snap is attached to the leader.

ATTACH LURE

A lure is then attached to the leader and you are all ready for casting. If no leader is used, let the lure hang about four inches from the end of the rod. When a leader is used, the swivel can come within a half inch of the tip-top. Use your wrist and not your entire arm if you desire to cast with the least effort and greatest efficiency. There are three distinct movements to each cast. After you grasp the rod in the right hand, not too tightly, around the grip, turn the wrist until the reel is in a vertical position, handle on the upper side. Then place the thumb on the spool of the reel. Point the tip of rod at the target at which you wish to cast. In an easy manner bring the rod back over your right shoulder to an angle of about 45 degrees. Now bring the rod forward with a steady sweeping motion, with the tip of the rod following the path of the lure in its forward flight towards the spot you wish the lure to be cast. Release the thumb at the beginning of the downward movement the instant the lure starts traveling forward, which will allow the lure to be shot into the air and out over the water. When using a South Bend Level Winding Anti-Back-Lash Casting Reel, there is no need to check, or thumb, the spool of the reel to prevent it from overrunning. The instant the lure strikes the water, there will be no tension on the line and the spool will stop running automatically. This is the work of the anti-back-lash device on South Bend reels.

TWO METHODS OF RETRIEVING

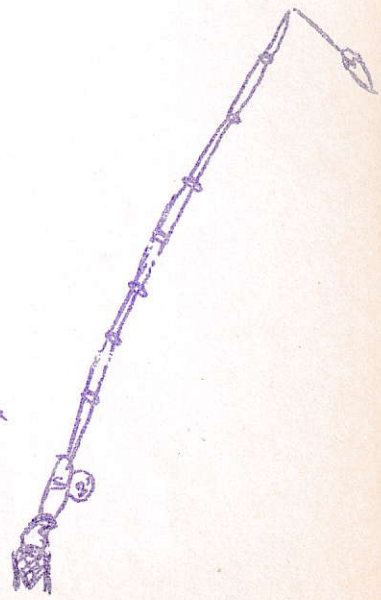
While the lure is still in the air the rod should be changed from the right to the left hand, to have it in readiness for retrieving. There are several methods of retrieving. One is to reel in with a uniform speed and the other to reel in a few feet, then stop, and then reel in a few more feet. This latter method, in the opinion of many anglers, is more productive of results, than when a steady speed is used in reeling.

The level-winding device winds the line evenly on the reel so no attention whatsoever need be given the spooling of the line.

AVOID "SIDE SWIPE" CASTING

The cast described above is the overhead one and the one in general use today. Another is called the side cast, commonly known as the side swipe. This is necessary when trying to place the lure under overhanging foliage but is not well to use when more than one person fish from the same boat.

Always remember to take a few minutes to adjust your reel correctly and follow directions included with each reel. Your back-lashes will be practically nil and within a very short period of time you will enjoy bait casting twice as much.



Starting the cast. In an easy manner start the rod back over your right shoulder. This illustration shows the start of the cast.

Continuing cast: As rod becomes perpendicular it can be brought back over the right shoulder to an angle of approximately 45 degrees. If the rod is allowed to go too far back over the shoulder, the lure will strike the water.

A FEW THINGS TO REMEMBER

There are several "helpful hints" that you will learn by experience. A few are given here and it is well to remember them at all times.

Never place a split bamboo rod away in a cloth bag or in an aluminum case, if either the bag or case is damp.

Keep a taut line, but do not try pulling your fish in by more strength. Play the fish and you will get the most fun and thrills when fishing.

Inspect the guides on your rod periodically. A slight crack in the Agate or Garnix, even though it cannot be seen with the nakes eye, will cause your line to wear out rapidly.

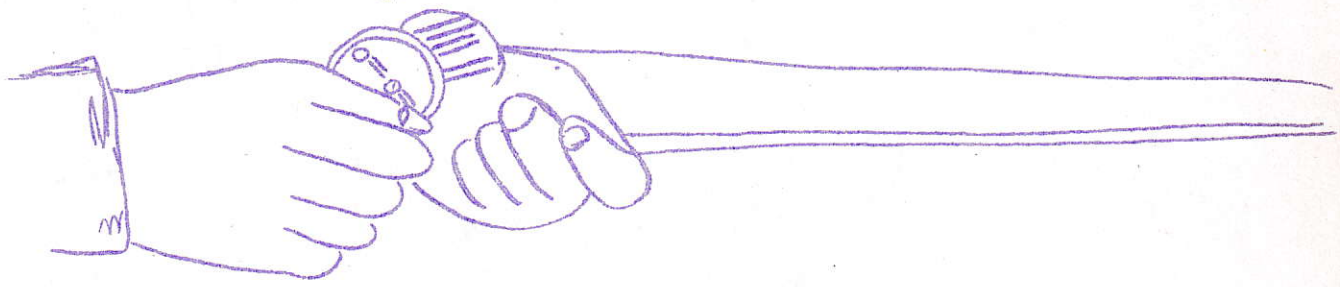
Always wet your hands before removing a fish from the hooks on your lure. Many times you may wish to return the fish to the water and if your hands are not wet, you will injure the fish.

Don't be a fish hog. A fish hog is a person who tries to catch all the fish in the lake or river, regardless of conservation laws. Keep only the number of fish you need for yourself.

Be a good sport and return to the water any undersized fish that you may catch. Remember that you have twice as much fun catching the "big ones" as you do the "little ones."

Help the other fellow. If you can offer helpful suggestions to a fisherman that may not know the "ins and outs" as well as you, do so. Remember that we all learn by experience.

Best o' fishing luck.



COMMON FLY AND PLUG PATTERNS

Cahill	White Moth	Black Hackle
Coachman	McGinty	Brown Hackle
Royal Coachman	Blue Dun	Professo
Light Cowdung	Grey Dun	Orange Miller
Silver Doctor	Whirling Dun	

ASTRONOMY

To obtain a Merit Badge for Astronomy, A Scout must:

1. Identify in the sky (a) 10 conspicuous constellations, including at least 4 in the Zodiac; (b) at least 8 first-magnitude stars.

2. Chart the position of Venus, Mars or Jupiter among the stars over a period of four or more weeks; OR chart the moon's path through four constellations in the Zodiac.

3. Sketch the position of the Big Dipper and its relation to the North Star and the horizon early some evening and again six hours later the same night. Record the date and hour of the making of each sketch.

4. Indicate in the sky the limits of the group of stars which, as seen from your latitude, never set. By your own observations determine whether the Big Dipper or Cassiopeia ever set.

5. Draw a diagram showing the relation of the Sun, Moon, and Earth at new Moon, first quarter, full Moon, and last quarter. Draw a diagram showing the relation of the Sun, Moon, and Earth at an eclipse of the Sun, and another for an eclipse of the Moon.

6. Explain the principal cause of the tides, Draw a diagram showing the relation of the Sun, Moon, and Earth when we have the highest tides and the lowest tides.

7. Explain the principal difference between a reflecting and a refracting telescope. Illustrate by simple diagrams.

THE SOLAR SYSTEM

The Solar System is the name of our own particular universe. Just how old it is, or just exactly how it came into being no one will ever know, but geologists say that there has been life on the Earth for at least a billion years.

According to the Chamberlain-Moulton theory our system of planets was first formed when a passing star created a tidal wave in the sun and dragged from the sun an immense amount of gaseous material, which later condensed and solidified to form the planetary system.

Mercury, our smallest planet, is only 36 million miles from the sun, and so far as it is now known it does not revolve on its own axis. Therefore, one side of it must be terribly hot and the other side extremely cold, so that life (as we think of it) could not possibly exist there.

Venus, our closest neighbor in size and in space, is a planet only 200 miles smaller in diameter than our own. We do not know accurately whether or not it revolves on its axis because of the thick layer of clouds covering it at all times. There may be life on Venus, but it would probably have to be almost entirely aquatic.

The Earth, our own planet, of course, is the most interesting to us. Although we see its huge mountains and know that it has tremendously deep oceanic depths is still relatively smoother than a bowling ball. It goes hurtling through space on

its path around the Sun at the enormous speed of 18½ miles per second.

The Moon, our only satellite, is 238,857 miles away. It is about 2,160 miles in diameter and its period of rotation is exactly equal to its period of revolution around the Earth, so that we, here on Earth, see only one side of the Moon.

The Moon has no atmosphere and no water, so that mountains that were made when the Moon was first created are still as lofty and sugged as they were originally, for there is no erosional force to wear them down. Since the days are two weeks long, the temperature varies from 120 degrees C. in the middle of the "Day" to -80 degrees C. in the middle of the "night." The craters on the Moon are its most conspicuous features. They vary from 50 to 100 miles in diameter, and the ring around them may be anywhere from 1,000 to 20,000 feet high. There are two main theories as to their origin. The first, that the Moon was subjected to more likely theory, is that the craters are of volcanic origin. This theory is borne out by several facts; one, that the "rays" radiating from many of the craters are quite similar to the fault lines we find here on Earth; the second, that sulphur has been discovered in one or two of the craters on the Moon.

The reason for the phases of the Moon is easily discoverable when in a dark room one uses a flashlight for the sun, one's own eye for the earth and an apple or a ball for the moon. When the Earth is at the apex of a right angle between the Moon and the Sun, we see a half moon. Our full moon occurs when the Moon is on the far side of the Earth from the Sun, and we see no Moon at all when the Moon is between the Sun and the Earth.

There has probably been more conjecture about the probabilities of life on the planet Mars than about any other heavedy body. This was brought on by discovery by Prof. Lowell some years ago of peculiar markings on the surface of the planet, markings that he called "canals" and which he said could only be made by intelligent beings, since they are a projection of a straight line on a curved surface and also since many of them are parallel for hundreds of miles. These canals are seasonal, appearing in the spring when the polar icecaps melt and disappearing when the icecap is practically gone. He did not claim to see the canals himself but said that the long dark lines were undoubtedly vegetation growing along something that could only be a canal. At the junction or crossing point of two canals there is usually a larger spot, which might be a lake. It would be most interesting to try to imagine what kind of "man" would live on Mars. He would probably be big because of the scarcity of water. His head would probably be much larger than any Earth man's head because, since the planet Mars is much smaller than the Earth, life would have been possible much earlier; therefore, any civilization on Mars would be much older than ours and "mens" brains would have developed much more. If the lines we see are canals, then the government of whatever people live on Mars must extend over the whole planet, for the canals seem to recognize no political boundaries.

Between Mars and Jupiter lies a belt of planetoids -- small pieces of rock varying from 5 to 500 miles in diameter and following in their path around the Sun, and the orbit that an intermediate planet might follow. There could be no possible life on them, for none of them are large enough to hold an atmosphere of their own.

Jupiter, our largest planet, lies 483 million miles away from the Sun. It is still in a semi-liquid state and its density is so light that it would float on water. It would certainly take a web-footed man to live on that planet. Wide cloud belts surround it and nine moons revolve about it. Four

of these moons are visible with a pair of good field glasses or a small "telescope." A "year" on Jupiter is 12 years long! (i.e. it takes twelve of our years to make a complete circuit of the Sun.)

Saturn is a very interesting planet. It is only slightly smaller than Jupiter and it too has nine moons. However, its most interesting characteristic is its ring system. It is surrounded at its equator by three enormous broad rings. The rings are each several thousand miles wide, but are only a few miles thick, so that even with our most powerful telescope when the ring is edge on to us we cannot see it. These rings are not solid, but are made up of a countless number of small "moonlets."

Three more planets lie outside the orbit of Saturn. They are Uranus, with its four moons; Neptune, with one moon; and the newly discovered planet Pluto, lying so far away from the Sun that to an observer on Pluto the Sun, 3670 million miles away would merely be a small yellow disc. Pluto takes about 250 years to make a complete circuit of the Sun.

The Sun, the master of our whole Solar System, is an enormous fiery ball 864,100 miles in diameter and about 92,870,000 miles away from our Earth. It is composed of gases and semi-liquids, heated to incandescence and continuously in a state of fiery upheaval. Even the storms on the Sun (the sun-spots) are many times larger than our little planet. If you were to get on a railroad train that would continuously travel at 60 miles an hour, it would take you 175 years to get from the Earth to the Sun, and the fare would probably be over $3,000,000. Even light travelling 186,000 miles per second - that is 11,000,000 miles per minute, would take 8 - 1/3 minutes to get from the Sun to the Earth, and as another example of the immensity of our system -- if the Sun were reduced to a ball two feet in diameter, the Earth, the size of a small pea, would be 215 feet away and the nearest star, still on the same scale would be more than 11,000 miles away.

So here you have a few facts about our own Solar System, as well as a few figures that look pretty big, but when you begin to realize that the nearest star to our Solar System is 4½ light years away, and that there are countless billions of other stars much farther away that are still within the boundaries of our own Milky Way universe and that there are other universes perhaps greater in size than ours beyond the Milky way, we begin to be a bit staggered and to realize that perhaps we on earth aren't such big shots after all!

But these names and figures are not "Astronomy" to the boy. You have to mix in a lot of imagination and you have to get his imagination stirred too.

The best method, I think, is not to take out a large crowd but to take eight or ten boys at a time. Give them a little information and start them asking questions. A star hike overnight to some bare hillside, where the boys can lie in their blankets and look at the stars is a powerful stimulant to their imaginations -- especially when there are lots of meteors appearing!

In passing first class star study, I would suggest that the naturalist construct a box, perhaps 6x6x6 open at one end and with some sort of a light in it. The boy, after identifying the constellation in the sky could take a 6x6" piece of cardboard and punch the star-pattern in it. The cardboard, held in front of the box in the dark, would look like that constellation.

A powerful flashlight makes a good pointer for the instructor.

To find most easily the constellations listed on the following page -- Stand on an east-west line facing due north -- the constellations #1 and to

#12 then appear in the order shown in the Northern half of the sky, and "reading from west to east."

Constellations #13 to 20 are similarly found in the southern half of the sky-reading "from east to west."

We have already partially covered Req. #3 - but to finish it - Tides are caused by the Moon's attraction on the Earth. Eclipses of the Sun are caused by the moon coming between the sun and the earth, and eclipses of the moon by the earth coming between the sun and the moon. Meteors, "Shooting stars," are observed when a piece of rock or metal, flying through space, is attracted to the earth. The friction of our atmosphere causes the meteor to glow or burn. A Comet is a group of rocks and gases held together by a common center of gravity and revolving in an eccentric eclipse around the sun. The tail, which only develops near the sun, is make up of extremely light gases driven away from the head of the comet by the pressure of sunlight. The earth could collide directly with the head of a comet and suffer nothing more than a severe meteoric shower.

THE SOLAR SYSTEM

PLANET	DIAMETER (size)	DISTANCE FROM THE SUN	DISTANCE FROM THE EARTH	LENGTH OF YEAR	SATELLITES (Moons)
	Miles	Million miles	Million miles		
MERCURY	3100	36		88 days	
VENUS	7700	67		224 days	
EARTH	7920	93		365¼ days	1 Dia. 2160 Mi.
MARS	4215	142	48	687 days	2
THE ASTEROIDS	1-500	136-530			
JUPITER	88,640	483	483	12 years	9
SATURN	71,500	886	886	29 years	9
URANUS	32,400	1782	1782	84 years	4
NEPTUNE	31,000	2793	2793	165 years	1
PLUTO	3,600	3670	3670	250 years	

THE TWENTY-ONE BRIGHTEST STARS

1. Sirius
2. Canopus
3. Alpha Centauri (Nearest star)
4. Vega
5. Capella
6. Arcturus
7. Rigel
8. Procyon
9. Acheinas
10. Beta Centauri
11. Altair
12. Betelgeuse
13. Alpha Crucis
14. Aldebaran
15. Spica
16. Pollux
17. Antares
18. Fomalhaut
19. Deneb
20. Regulus

CONSTELLATIONS VISIBLE DURING OWASIPPE CAMP SEASON

1. Leo - The Lion (Regulus)
2. Canes Venatici - The Hounds
3. Ursa Major - The Big Dipper
4. Ursa Minor - The Little Dipper (North Star)
5. Draco - The Dragon
6. Cassiopeia - The Queen's Throne
7. Cepheus - The King
8. Cygnus - The Northern Cross (Deneb)
9. Lyra - the Lyra (Vega)
10. Sagittarius - The Archer
11. Delphinus - "Job's Coffin"
12. Aquila - The Eagle (Altair)
13. Ophiuchus - The Serpent Bearer
14. Scorpio - The Scorpion (Antares)
15. Serpens - The Serpent
16. Hercules - The Giant
17. Corona Borealis - The Northern Crown
18. Bootes - The Herdsman (Arcturus)
19. Virgo - (Spica) - The Virgin
20. Corvus - The Crow

BIRD STUDY

To obtain a Merit Badge for Bird Study, A Scout must:

1. Produce a list of forty species of wild birds which have been personally observed and positively identified in the field and tell how to differentiate each from those other species with which it might be confused.

2. Produce a list showing the greatest number of species that you have seen in the field in one week.

3. Produce a list derived from personal reading of: (a) 20 species of birds particularly noted for their value to agriculture in the destruction of insects and weed seeds; (b) 10 birds of prey particularly useful in the destruction of rats and mice; (c) 10 species of fish-eating birds, and tell why they are not inimical to man's interests.

4. Describe at least two bird boxes or a bird bath, and two feeding stations that have been constructed and erected by him.

5. (a) From personal observation name and describe the birds you have seen in three different habitats (open fields, woodlands, farmlands, marsh, etc.) and tell why all birds do not choose the same habitat. Make at least three visits to each type of countryside; OR (b) make a census of the bird-life of a 25-acre tract by systematically covering the ground on three separate days and listing the species and number of individuals of each observed.

6. State what you did to protect birds from slaughter; and to promote the creation of bird preserves and sanctuaries.

OWASIPPE BIRDS

1. Pied-billed Grebe
2. Loon
3. Herring Gull
4. Common Tern
5. Great Blue Heron
6. American Bittern
7. Green Heron
8. Greater Yellowlegs
9. Spotted Sandpiper
10. Killdeer
11. Partridge
12. Quail
13. Blue Jay
14. Mourning Dove
15. Marsh Hawk
16. Coopers Hawk
17. Red-tailed Hawk
18. Red-shouldered Hawk
19. Bald Eagle
20. Bronze Grackle
21. Screech Owl
22. Great Horned Owl
23. Yellow billed Cuckoo
24. Kingfisher
25. Hairy Woodpecker
26. Downy Woodpecker
27. Red-headed Woodpecker
28. Flicker
29. Whip-Poor-Will
30. Nighthawk
31. Ruby-throated Hummingbird
32. Kingbird
33. Crested Flycatcher
34. Phoebe
35. Wood Pewee
36. Least Flycatcher
37. Crow
38. Cowbird

39. Baltimore Oriole
40. Vesper Sparrow
41. Goldfinch
42. Tree Sparrow
43. Chipping Sparrow
44. Field Sparrow
45. Song Sparrow
46. Towhee
47. Cardinal
48. Indigo Bunting
49. Scarlet Tanager
50. Rose-breasted Grosbeak
51. Purple Martin
52. Barn Swallow
53. Tree Swallow
54. Bank Swallow
55. Cedar Waxwing
56. Red-eyed Verio
57. Warbling Verio
58. Black-throated Green Warbler
59. Black & white Warbler
60. Pine Warbler
61. Ovenbird
62. Maryland Yellowthroat
63. Catbird
64. Brown Thrasher
65. House Wren
66. Marsh Wren
67. White-breasted Nuthatch
68. Tufted Titmouse
69. Chickadee
70. Blue Bird
71. Robin
72. Coot

Birds seen around Camp - 1928-1936 (Arranged according to "Birds of America")

BIRDS BENEFICIAL TO AGRICULTURE

1.	Bluebird	68%	insects-hoppers
2.	Robin	42%	" -beetles
3.	Chickadee	68%	" caterpillars
4.	Wren	98%	" caterpillars
5.	Brown Thrasher	41%	" beetles
6.	Catbird	44%	" ants, beetles
7.	Barn Swallow	99%	" flyers
8.	Tree Swallow	99%	" flyers
9.	Towhee		" gr. bugs
10.	Chipping Sparrow	40%	" grasshoppers
11.	Song Sparrow		weed-seeds
12.	Field Sparrow		weed-seeds
13.	Baltimore Oriole	84%	" caterpillars
14.	Meadow Lark	74%	" gr. bugs
15.	Cuckoo	90%	" caterpillars
16.	Quail	15%	" weed-seeds
17.	Kingbird	90%	" flyers
18.	Phoebe	89%	" flyers
19.	Downy Woodpecker	75%	" beetles
20.	Red-headed Woodpecker	70%	" beetles
21.	Flicker	80%	" ants
22.	Tree Sparrow		weed-seeds

(U. S. Government figures)

BENEFICIAL BIRDS OF PREY

1.	Marsh Hawk	Rodents	
2.	Red-tailed Hawk	"	= small animals
3.	Red-shouldered Hawk	"	insects
4.	Sparrow Hawk	"	insects
5.	Broad-winged Hawk	"	insects
6.	Swainson Hawk	"	insects
7.	Rough-legged Hawk	"	
8.	Pigeon Hawk	"	
9.	Screech Owl	"	insects
10.	Short-eared Owl	"	
11.	American Long-eared Owl	"	
12.	Barn Owl	"	
13.	Barred Owl	"	

(According to the U.S. Department of Agriculture and Nature Magazine)

BIRDS THAT PROTECT TREE TRUNKS

1. Downy Woodpecker
2. Hairy Woodpecker
3. Flicker
4. Chickadee
5. Tufted Titmouse
6. Brown Creeper
7. Black & white Warbler
8. White-breasted Nuthatch
9. Red-breasted Nuthatch
10. Kinglet
11. Almost any Warbler

PUBLICATIONS ON BIRDS
(Free)

"Birds of Illinois"
Cons. Pub. #6
Department of Conservation
Springfield, Illinois

"50 Common Birds of Farm and Orchard"
Farmers' Bulletin 513
Department of Agriculture
Washington, D.C.

"Some Common Birds Useful to the Farmer"
F.B. #360

"Community Bird Refuges"
F. B. #1239

"How to Attract Birds"
F. B. #912

"The English Sparrow As a Pest"
F. B. #493

"Food of Some Well-Known Birds"
F. B. #506

BIRD STUDY — REQUIREMENT #7

This is one of the most difficult of the bird study requirements and the average boy would have a hard time living up to the letter of the law, so it is suggested that the Naturalist, rather than having him carry out every little detail, create in the boy the desire to protect birds. This can be done by emphasizing the beauty of the birds, their usefulness to mankind, and the lack of manliness in any boy who kills birds.

Actual projects that might be done around camp are as follows:

1. "Post" the camp area
2. "Post" the headquarters
3. "Post" the Spillway - "Scout Game Preserve" No Hunting
4. Put out food daily

The hill back of the Saddle-bag Cabin in the early morning is usually alive with birds. The Naturalist might establish a sanctuary on this hillside by transplanting bushes and small trees, and by putting out all kinds of bird food, such as cracked corn, wheat, sunflower seed and peanuts.

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In covering Requirement #6 the Naturalist might run a contest with a nice prize to be given for the best birdhouse made each period.

(See "Homes for Birds" Farmer's Bulletin #145
U.S. Department of Agriculture, Washington, D.C.)

TINY BIRD ATTACKS PLANE NEAR ITS NEST; RIPS FABRIC

Regina, Sask. July 17 - A plane, piloted by Ernest Austen, was attacked today by a tiny kingbird above its nest near Provost. The bird tore strips of fabric from the machine.

(Article taken from the Chicago Tribune)

BOTANY

To obtain a Merit Badge for Botany, a Scout must:

1. Make five field trips of at least two hours each, to observe wild plant life. Keep record based on field notes, of varieties of flowers found, with date, place, nature of locality, (swamp, roadside, woods, meadow, etc.) and other observations such as seeds, seed pods, leaf arrangements, insect attraction. (If photographs or sketches are included record will be more interesting.)

2. Identify from living specimens at least 50 plant specimens.

3. Identify in three or more specimens all parts of a perfect and complete flower. Explain (a) how plants are pollenized; (b) how ferns differ from flowering plants.

4. Identify specimens of at least ten families of flowering plants, (other than trees), or submit properly labeled specimens of such families. (May be included as part of 8b).

5. Know what plants are rare in your vicinity and what is being done or should be done to protect them.

6. Explain how plants use light, heat, water, oxygen, and carbon dioxide; how they manufacture their own food.

7. Submit or identify in field one specimen each of fungi, algae, lichens, and mosses. (Scouts living in regions where this requirement is not possible, may substitute five different species of ferns or desert plants.)

8. Carry out one of the following projects: (a) Submit a seed collection, properly labeled, of at least 20 different kinds of seeds gathered by yourself; germinate at least five species; find out all you can about different varieties of seeds and how they are scattered; (b) Submit specimens of at least 30 species of flowering plants. Include leaf, stem, flower and root (if not of rare plant). Mount neatly, label both with common and scientific name, date, place found, nature of locality; (c) Make a study of plant life in an area of not less than 15 square feet for at least two months. Keep record of species found, type of locality, insect attraction, seeds, etc.; (d) Raise a wild flower or fern garden, including at least 5 different species of plants. Know: (1) both common and scientific names of each; (2) proper methods of transplanting and care.

FLOWERS FOUND AROUND OWASIPPE, MICHIGAN
(from the collection of E.F. Schmidt)

1. Small Bur-reed
2. Michigan Lily
3. Smaller Purple-Fringed Orchis
4. Moccasin Flower
5. Water Smartweed
6. Smartweed
7. Bouncing Bet
8. Night-flowering Catch-fly

FLOWERS FOUND AROUND OWASIPPE MICHIGAN (cont'd)

9. White Water-Crofoot
10. Anemone (Thimbleweed)
11. Tall Hedge Mustard
12. Watercress
13. Pepper grass
14. Meadow Sweet
15. Cinquefoil
16. Dwarf Wild Rose
17. Wild Rose
18. Alsike Clover
19. Alfalfa
20. Tick Treefoil
21. Blue Vetch
22. Milkwort
23. Flowering Spurge
24. Spotted Jewel-Weed
25. New Jersey Tea
26. St. Johnswort
27. Rock Rose (Frostweed)
28. Hudsonia
29. Evening Primrose
30. Bergamot
31. European Bittersweet
32. Sweet Goldenrod
33. Black-Eyed Susan
34. Woodland Sunflower
35. Queen Anne's Lace
36. Water Parsnip
37. Pipsissawa
38. Shin-Leaf
39. Bearberry
40. Wintergreen
41. Fringed Loosestrife
42. Spreading Dogbane
43. Butterfly Weed
44. Hedge Bindweed
45. Puccoon
46. Blue Vervain
47. Sand Bergamot
48. Wild Canada Mint
49. Mad Dog Skull Cap
50. Self-Heal
51. Hedge Nettle
52. Monkey Flower
53. Downy False Foxglove
54. Fern-leaved False Foxglove
55. Bedstraw
56. Venus' Looking Glass
57. Harebell
58. Cardinal Flower
59. Spiked Lobelia
60. Boneset
61. Grass-Leaved Blazing Star
62. Great-Leaved Astor
63. Heath Astor
64. Daisy Fleabane
65. Chicory
66. Dwarf Dandelion
67. Dewberry
68. Goat's Rue or Catgut
69. Shirley Poppy
70. Sedge
71. False Flax
72. Columbine

Authority - Mathews Handbook of
American Wild Flowers

FLOWERS FOUND AROUND OWASIPPE, MICHIGAN
(from the collection of Great [illegible]by)

Trailing Arbutus
Flowering Spurge
Indian Cucumber
Lupine
Honeysuckle
Clintonia
Jack-in-the-Pulpit
Minterwort
Golden Ragwort
Bellwort
Pearly Everlasting
Wake Robin
White Trillium
Huckleberry
Partidge Berry
Horse Mint
Arethusa
Wild Ginger
Gold Thread
Wintergreen
Puccoon
Tall Meadow Rue
Spring Cress
Mayapple
Moccasin Flower
Star Flower
Bunchberry
Nooding Trillium
Frostweed
Star of Bethlehem
Silverweed
Forget-me-not
Hedge Nettle
Catnip

Purple-fringed Orchis
Yellow-fringed Orchis
Wild Peanut
Water Parsnip
Common Plantain
Wild Lettuce
Green Flowered Milkweed
Agrimony
Yellow Loosestrife
Common Cinquefoil
Turk's Cap Lily
Monkey Flower
Common Milkweed
Common Dandelion
Silver Cinquefoil
Goldenrod
Mullin
St. John's Wort
Blue Vervain
Viper's Bugless
Bouncing Bet
Chicory
Bur Reed
Jewel-weed
Downy False Foxglove
Ten Petaled Sunflower
Rattlesnake Weed
Poppy
Bluets
Elderberry
Harebell
Hairy Vetch
Arrowhead
Buttonbush
Joe Pye Weed
Fireweed
Watercress
Columbine
Tall Blazing Star
Downy Thistle
Mouse Ears
Dwarf Sumac
Sedge
Giant Hyssop
Cotton Grass
Indian Hemp
Swamp Milkweed
Giant Lobelia
Cardinal Flower
Alsike Clover
Red Clover
White Sweet Clover
Bedstraw
Boneset
Steeplebush

Ragweed
Smartweed
Pickerel Weed
White Campion
Fringed Loosestrife
Yellow Wood Sorrel
Ironweed
Sneezeweed
Coreopsis
Dwarf Dandelion
Evening Primrose
Spreading Dogbane
New Jersey Tea
Thimble Weed
Blue Vetch
Brown-Eyed Susan
Butterfly Weed
Wild Rose
Pipsissewa
Pogonia
Daisy Fleabane
Grass Pink
Bittersweet
Partridge Berry
Bergamot
Queen Anne's Lace
Peppermint
False Sunflower
Bearberry
Yarrow
Shinleaf
Spatterdock
Water Lily
Skull-cap
Self-Heal
Knot Grass
Pigeon Berry
Rattlesnake Plantain
Smooth False Foxglove
Butter and Eggs
New England Aster
Spleenwort
Pitcher Plant
Water Plantain
Sweet Everlasting
Meadow Sweet
Ladies' Thumb
Snow Drops
Indian Pipe
Turtle Head
Wild Cucumber
Lousewort
Rattlesnake Root
Rabbit Clover
Checkerberry

PLANT SEEDS FOUND AROUND OWASIPPE DURING THE CAMP SEASON

1. Jack Pine
2. Norway Pine
3. Tamarack
4. Hemlock
5. Arbor Vitae
6. Willow
7. Walnut
8. Canoe Birch
9. Alder
10. Beech
11. White Oak
12. Black Oak
13. Mulberry
14. Sassafras
15. Apple
16. Wild Red Cherry
17. Locust
18. Staghorn Sumac
19. Pepper Grass
20. Wild Rose
21. Evening Primrose
22. Woodland Sunflower
23. Bearberry
24. Wintergreen
25. Dandelion
26. Service Berry
27. Red Raspberry

WOOD LAND PLANTS

1. New Jersey Tea
2. Pipsissawa
3. Wintergreen
4. Harebell
5. Self-Heal
6. False Foxglove

NEAR WATER PLANTS

1. Blue Flag
2. Bur-Reed
3. Spiked Lobelia
4. Pink Pondweed
5. Cardinal Flower
6. St. John's Wort

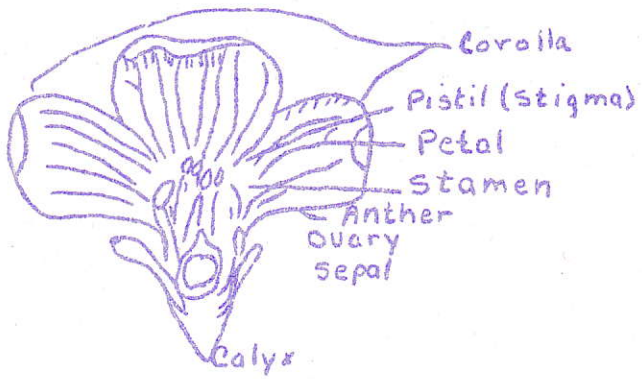
OPEN FIELD PLANTS

1. Butterfly Weed
2. Evening Primrose
3. Daisy Fleabane
4. Goldenrod
5. Flowering Spurge
6. Dwarf Dandelion

ROADSIDE PLANTS

1. Pepper Grass
2. Sunflower
3. Black-Eyed Susan
4. Goldenrod
5. Meadow Sweet
6. Asters

(Req. #4)



(Req. #5)

"Plants manufacture their food by a process called "Photosynthesis". The chloroplasts of the leaf, plus sunlight, take carbon dioxide out of the air and water out of the soil, separate them and recombine them into starch. ($C_6H_{10}O_5$)

In this process there are twelve parts of Oxygen left over. This oxygen is not needed by the plant so it is released into the air.

Mineral food is taken in a dissolved form, into the plant by the roots."

(From Dr. H. S. Pepoon - Illinois Natural History Survey)

(Req. #6)

FERNS	FLOWERS
Fibrovascular bundles regular	Fibrovascular bundles irregular
No blossoms	Blossoms
Spores	Seeds

There are more ferns than flowers.

Ferns reproduce in two ways; by spores and by rhizomes. The spores drop or are thrown to the ground, where some of them develop into tiny, scale-like, heart-shaped bodies called "Prothalli". Each prothallus develops male and female organs on its underside. The fusion of these organs creates a "zygot", from which grows the fern-plant.

Rhizomes (roots) travel along underground and send up shoots which become new ferns.

FERNS FOUND AROUND OWASIPPE

1. Bracken Fern
2. Royal Fern
3. Sensitive Fern
4. Marsh Fern
5. Cinnamon Fern
6. Eastern Lady Fern
7. Rattlesnake Fern
8. Crested Fern
9. Margined Fern
10. Maidenhair Fern

(Req. #7)

FUNGI

1. Death Angel
2. Earth Star
3. Gemmed Puffball
4. Cinnamon Bracket
5. Pale Bracket
6. Burnt Wood Bracket

ALGAE

1. Pleurococcus

LICHENS

1. Reindeer Moss
2. Folulore Lichen

MOSSES

1. Sphagnum Moss
2. White Moss

EDIBLE WILD FRUITS

1. Sunflower
2. Blackberry
3. Blueberry
4. Dewberry
5. Huckleberry
6. Sand Cherry
7. Wild Black Cherry
8. Scarlet Haw
9. Raspberry
10. Service Berry
11. Wild Strawberry

MEDICINAL PLANTS

1.	Witch Hazel	=	Leaves and Bark	= Tea and Poultice
2.	Kinnikinick (Red Willow)	=	Leaves	= Astringent Poultice
3.	Slippery Elm	=	Bark	= Poultice
4.	Balsam	=	Gum	= Antiseptic
5.	Hemlock	=	Resin	= Antiseptic
6.	Tamarack	=	Bark	= Poultice
7.	Basswood	=	Root Bark	= Poultice
8.	Cottonwood	=	Root Bark	= Poultice
9.	Alder	=	Bruised Leaves	= Poultice
10.	Sassafras	=	Bruised Leaves	= Poultice
11.	Plantain	=	Leaves	= Burns
12.	Plantain	=	Dry Leaf Powder	= Stops Bleeding

WILD GREENS

1. Curled Dock
2. Dandelions
3. Chicory
4. Watercress
5. Cattail
6. Ladies Thumb

(See "Camping and Woodcraft" by Horace Kephart
Paragraph 11, Page 367)

EDIBLE ROOTS

1. Arrowhead
2. Jack-in-the-Pulpit
3. Spatterdock
4. Indian Cucumber
5. Skunk Cabbage

SOIL AND WATER CONSERVATION

To obtain a Merit Badge for Soil and Water Conservation a Scout must:

1. Determine the depth of topsoil in at least two contrasting areas, such as grazed and ungrazed woods; cultivated fields and fields left in grass, grazed pastures and ungrazed haylots; well-kept lawn and heavily cropped garden; etc.

2. Plant two bean seeds in a flower pot to topsoil, and two bean seeds in a flower pot of subsoil. Tend them for a month and report on difference in rate of growth in two pots, appearance of plants, and other differences.

3. (a) Describe the different types, causes, and results of soil erosion. (b) Show snapshots or rough sketches of two examples of erosion in your community. (c) Explain what is meat by soil depletion.

4. Explain the meaning of the following terms: (a) contour farming; (b) strip cropping; (c) rotation of crops; (d) terracing; (e)cover crops.

5. On a road map or similar map, point out the watershed area for your community.

6. Make a diagram-sketch, showing how rain water falling to the ground eventually gets to your kitchen faucet.

7. Explain how man's use of land in the watershed affects your community's water supply.

8. Do <u>One</u>:
   a. Help build a stock pond or farm pond.
   b. Make a study of plant, animal and fish species in a pond, and if necessary carry out such practices as will increase the fish population.
   c. Carry out a bank erosion control or other improvement project on a stream, pond or lake.
   d. Control a gully by building necessary diversion ditches and brush dams or other structures, and planting to grass and shrubs.
   e. Take an active part in removing the cause of pollution of a stream, pond or lake.
   f. Help to plan, survey and lay out a drainage or irrigation system for a field or other area that needs drainage or irrigation.
   g. Help build drainage or irrigation ditches on a field.
   h. Find out what is done with domestic and industrial waste in your community and write at least 500 words on the methods used to prevent pollution and to purify your water supply.
   i. Help to plan, survey, or lay out contour furrows or water spreading dikes on pasture or range land.
   j. Carry out any other water management project approved by your counselor or representative of the local Soil Conservation District, National Forest, or Taylor grazing district.

9. DO One:

a. Help carry out a soil conservation project on a farm or Scout camp cooperating with the local soil conservation district.

b. Plant 100 tree or shrub seedlings on school grounds, park, camp, or as a windbreak for buildings or a blowing field.

c. Test the soil, fertilizer, and as needed, lime, and plant grass or perennial legumes on ½ acre of lawn, school grounds, camp, or other eroding area that is unsuited for cultivation.

d. Take an active part in the program for a "Farmer's Field Day", "Face Lifting", or other soil conservation demonstration project.

e. Trace a conservation survey map of a local farm or Scout camp and describe the different land classes found on it and tell what each different area should be used for and what conservative measures are needed on it.

f. Help survey and lay out a plot of land for terracing, or strip cropping, or contour ploughing.

g. Help construct terraces on a field.

h. Help plan, lay out or construct a grass waterway for a field or other eroding area where a waterway is needed.

i. Carry out any other soil conservation project approved by your Counselor or representative of the local Soil Conservation District, National Forest or Taylor grazing district.

j. Reseed one acre of pasture or range land on which the present grass cover is insufficient to guard the soil against erosion.

To obtain a Merit Badge for Wildlife Management:

1. Do One:

a. On a rough sketch of a five-acre area — (1) Show and identify the chief types of plant cover; (2) Show the location (and identify) nests, dens, runways, droppings, feeding and other animal signs.

b. On a five-acre area — (1) Identify three of the chief tree, three of shrub, or three ground cover species used by animals for food, shelter or cover. (2) Identify by signs or sign, 10 of the animal species found in the area.

2. Describe the value of three wild animals each as sources of food, clothing and recreation; and the role of three animals each in insect, weed and rodent control.

3. (a) Describe the damage to wildlife resulting from wildfire, overgrazing, unwise forest practices, soil erosion, unwise drainage, "slick and clean" farming, and water pollution. (b) Explain the relationship between wildlife and the natural habitat and how man controls the natural environment.

4. Explain who makes laws setting definite seasons and bag limits on hunting, fishing and trapping in your state, and the reason for the laws.

5. DO One:

a. Make a wildlife count on each of two contrasting approximate five acre plots. Grazed versus ungrazed woodlots; or strip cropped versus solid planting; or burned over versus not burned over area; or other contrasting areas.

b. Visit a state or federal or private game refuge or game management area with a wildlife technician, and write at least 500 words on what is being done to make the area better for wildlife.

c. Visit a game farm or fish hatchery with a wildlife technician and write a report of at least 500 words on the pros and cons of game stocking against habitat improvement as means of increasing wildlife populations.

d. Attend a recognized camp for at least a week where conservation is a major part of the program and describe how you will use the information you learn.

e. Go out for at least two days with a commercial fisherman and describe his catch and methods used.

f. Select one wildlife species common to your neighborhood and find out what management practices are used, or the practices that may be necessary to maintain the species.

6. Do One:

a. Help build, stock or fertilize a farm pond.

b. Plant stream or ditch banks to control erosion.

c. Build a fence or plant a "living fence" to exclude stock from a woodlot, stream or lake to provide shelter for fish and to help reduce erosion.

d. Set out 200 food plants for birds and mammals.

e. Build three check dams, deflectors or cover devices in a stream or lake to provide shelter for fish and to help reduce erosion.

f. Study the fish species in a pond or lake, and if necessary carry out such practices as may be necessary to benefit the fish.

g. Build and set out in suitable places ten nesting boxes or "den pipes".

h. Plant a windbreak or hedge or other suitable winter cover for wildlife.

i. Help plant a gully, road cut, fill or eroding area, to reduce erosion, build up soil fertility and at the same time provide shelter for wildlife.

Note: Many ideas are listed under the above listed Merit Badges on Soil and Water Conservation and Wild Life Management. Some requirements are not listed at this time but are in the process of being worked out.

DESCRIPTION OF OUR FORESTS

From the time of colonization, Forests have been our most important natural resources, and today there is hardly an article that man uses that is not somehow associated with wood. The great bulk of our forest lands now lie in the far West and in reforestation projects in the Eastern Mountains and Central North.

The value of our forests is inestimable - everything from erosion control to the price of bungalows on Main Street and the cost of a hunting license depends upon the woods.

Present Conservation Laws have mostly to do with fire control, since fire and insects are the two most deadly enemies of our woods. Scouts can do a lot to help the cause of Forestry, not only can they practice care

themselves with their fires in the woods, but they can teach caution to others by showing them that a forest fire not only destroys the wood itself, but also the ground where the trees stand and the wild birds and animals who live in the woods. Scouts can also help in reforestation and in game protection.

WILD LIFE

Visitors spend money in a good hunting and fishing state. Thus wild life should be conserved for business, as well as sentimental reasons. Sanctuaries and law enforcement are Wildlife's best protectors. Fish hatcheries restock lakes and streams. The principal wild animals found around camp are: deer, snowshoe hare, cotton-tail rabbit, red fox, bobcat, raccoon, muskrat, mink, skunk, red squirrel, black squirrel, gray squirrel, flying squirrel, mole, and chipmunk.

LANDS

Land is valuable only to the extent that it will produce living and growing things. Wheat and similar crops just won't grow around camp because of the sandy nature of the soil, however, trees like oaks and pines grow very well in sandy soil. Soil should be guarded against erosion and loss of fertility. The chief enemies of agriculture are insects and fungus diseases.

WATERS

For years lumbermen and farmers have been cutting forests and drain commissioners and others have been draining swamp areas and marshes. The result has been that our lakes and rivers seem to be smaller than they used to be.

Waters have been considered by many people as being designed especially for the disposal of sewage and other waste matters. Many of our streams are decidedly polluted. The result is that it is difficult to secure pure water for drinking and cleansing. The streams are no longer suitable homes for fish. Their aesthetic value is seriously impaired.

This resource is tied up quite closely with forestry, because in order to protect the depth of navigable rivers and to insure a constant flow of water rather than fluctuation of flood and dry spells, the headwaters and water-sheds of our great river system.

The use of cheap water-power conserves coal. Irrigation means more good farm land, especially in the West.

SUB-SOIL RESOURCES

Michigan has iron, copper, oil and natural gas. In the past there have been very few federal or state laws controlling production of these resources, however, there are now laws pro-rating production of oil and gas among the states. Michigan's allowable production was 32,800 barrels per day in 1933.

Game Birds - Pheasants, Grouse, Woodcock, Ducks, Snipe, Coots.

Game Animals - Deer, Rabbit, Muskrat, Raccoon, Opossum.
Game Fish - Trout, Bass, Pike

Mallard Duck -- Lives in and around water. Eats grain, roots, and small frogs, ets. 12 to 15 eggs in a ground nest lined with down.

Cotton-tail Rabbit -- Lives everywhere. Eats vegetation and sometimes bark. Raises 2 to 6 young at a time. Lives in burrows.

Brook Trout -- Fast cold streams. Eats insects and small fish. Lays 500 to 2,000 eggs at a time. These hatch in 3 to 6 months.

NATURAL RESOURCES AN INHERITANCE

The conservation of the bountiful natural resources of Michigan is vital to every inhabitant of the state. This is true whether it is considered from the point of view of the desires and ambitions of an individual or from the point of view of the needs of society as a whole.

The individual wishes to swim, to fish, to hunt, to go camping, or to enjoy nature in manifold ways. To do these things he must have lakes and rivers, fish, game, hunting areas, camping sites, and places where he can find nature. On the other hand, the individual may use the natural resources as a means of securing economic gain for himself. In doing this he produces wealth for the state. All people share in the economic values which come from mines, oil wells, salt deposits, limestone quarries, power dams, marl beds, and forests. All people share the economic values too, which come from commercial fishing, the resort business, and the tourist industry.

Society needs to have the 'recreating' values which come from wholesome outdoor activities. Because individual citizens possess so large an amount of leisure time, the social unit must for its own salvation provide opportunities for the good use of that leisure time. Society also needs the many values of the forests. Society needs the fuel, the building materials, the foods, the medicinal products, and the raw materials used in the manufacturing of articles essential to the happiness of people.

FORESTRY

To obtain a Merit Badge for Forestry, a Scout must:

1. Do One:
   a. Point out fifteen different species of forest trees or wild shrubs in the field and tell their names and chief uses. (If there are less than fifteen kinds growing locally, identify and tell the uses of those that may be found.)
   b. Collect leaves or winter twigs of fifteen forest trees or shrubs; mount them in a notebook, writing the name, where it grows in the United States and the chief uses.
   c. Obtain wood samples of ten different trees and tell some of the uses of each kind of wood.

2. (a) Describe the value of forests in protecting soil and building fertility, regulating the flow of water, wildlife management, and as recreational areas. Tell from what watershed or other source your community obtains its water. (b) Describe briefly the part that forest products play in our everyday life.

3. (a) Make a diameter tape or Biltmore Stick. Show how to determine the height and diameter of trees, Estimate the board foot volume of three trees selected by the Counselor. OR (b) Examine ten stumps or logs and discuss the reasons for variations in the rate of growth shown by the rings.

4. Describe what is meant by sustained yield forestry.

5. Do One:
   a. Mark a ¼-acrea plot for an improvement cutting (using chalk or paint to mark trees for removal) and tell why you would remove the marked trees.
   b. Help your Counselor or a forester make an improvement or harvest cutting.
   c. Grow and tend for one year 100 seedlings of forest trees or shrubs.
   d. Plant 100 seedlings for future lumber production, pulp wood or for soil and water conservation.
   e. Collect 20 mature cones from a coniferous tree, extract seed and run a germination test on the seed.
   f. Assist in planting a shelterbelt or windbreak and tell why the work is important.
   g. Help in some range improvement project approved by your Counselor.

6. (a) Describe the damage to forest, and watersheds resulting from fire, insects, tree diseases, overgrazing, unwise cutting practices. Tell what is being done to reduce this damage. (b) Tell what to do if a fire is discovered in woodlands. (c) Take part in a forest fire prevention campaign or build a fire lane of at least 100 yards at a location designated by a local fire warden or forester, or counselor.

7. Do One:
   a. Visit a logging operation, pulp or paper mill, wood preserving plant, furniture factory, veneer plant, mill working plant, saw mill,

turpentine still, or some other wood-using industry and write a report of about 500 words telling what the raw material is, where it comes from, and how the finished product is made, how products are used, and how waste materials are disposed of.

b. Visit a managed public or private forest area or watershed area with its manager or supervisor. Write a story of about 500 words on how they manage the forest to grow repeated crops of timber to protect the watershed, or to provide other services and benefits.

c. Help a forester, wildlife expert or your Counselor in some forest project that will benefit wild animals.

d. Help a forester mark a hiking or ski trail, improve a campground, or make some other improvement for recreational use.

e. Help your Counselor or a forester with some other type of improvement, or furnish evidence acceptable to the Counselor of some other activity or accomplishment of benefit to the forest or related resources.

f. Help a grazing officer make a survey.

FOREST TREES FOUND AROUND OWASIPPE, MICHIGAN
(from the Collection of E. F. Schmidt)

1. White Pine
2. Jack Pine
3. Norway Pine
4. Tamarack
5. Balsam Fir
6. Arbor Vitae
7. Black Willow
8. Sand Willow
9. Pussy Willow
10. Hemlock
11. Aspen
12. Large-Tooth Aspen
13. Balsam Poplar
14. Cottonwood
15. Lombardy Poplar
16. Black Walnut
17. Shagbark Hickory
18. Ironwood
19. Black Birch
20. Button Willow
21. Canoe Birch
22. Alder
23. Beech
24. White Oak
25. Pin Oak
26. Scarlet Oak
27. Black Oak
28. Slippery Elm
29. White Elm
30. Red Mulberry
31. Sassafras
32. Witch Hazel
33. Apple
34. Mountain Ash
35. Service Berry
36. Red Haw
37. Red Fruited Haw
38. Red Ash
39. Wild Black Cherry
40. Sand Cherry
41. Wild Plum
42. Common Locust
43. Staghorn Sumac
44. Dwarf Sumac
45. Mountain Maple
46. Sugar Maple
47. Red Maple
48. Basswood
49. Flowering Dogwood
50. High-Bush Huckleberry
51. Alternate-Leaved Dogwood
52. Hardy Catalpa

Authority — Field Book of American Trees and Shrubs - Mathews

FORESTRY

In collecting leaves perfect specimens should be taken. They should be immediately placed in a leaf press made of porous paper and put under heavy pressure. There are, growing around Owasippe, some 52 kinds, or more, of trees, about 20

of which are fairly common, so the Scout should have no difficulty in getting 15 specimens.

The collection of woods is more difficult than the collection of leaves, because of the damage done to a tree when a specimen is taken. For this reason, we would recommend that a good collection be made for the camp by the naturalist, and these specimens, or perhaps a duplicate set of them, be used to teach the boys. Knowledge of the wood itself can be put across by games and other methods. (The blindfold game is a good test -- there the boy is blindfolded and made to identify trees by his fingers.) The letter of the law might be lived up to by having the boy collect twigs. This would reduce the amount of damage to the tree.

Seed collection around Owasippe is quite simple, as there are about 20 kinds of trees that produce seeds during the camp season. Perhaps the best way to keep these seeds would be to put cardboard partitions in a cigar box, with corresponding labels on the top of the box. (See Botany Merit Badge)

FIRE -- THE RED POACHER

Not so many years ago this entire section of Michigan was covered with a wealth of forest growth. There were giant pine trees and an abundance of wild life. Today instead of these, we have thousands of acres of cut-over and burned-over lands. Cut-over lands followed the lumbering operations. Burned-over lands have followed forest-fires.

No one looks askance when forests are cut and are replaced by fields of grain. The fact that lumbering has bared the ground and has done nothing to replace the forests is regretable, but we can do little about it, other than to plant a few acres of new trees every year.

But it is principally the vast areas of burned-over land with which we are concerned. It represents punishment for carelessness with fire -- carelessness, with campfires, bonfires, matches and lighted tobacco. Ninety-five percent of all forest fires are caused by carelessness.

Men are the worst offenders against the forest. Last year their cigar and cigarette stubs, their pipe tobacco and matches, caused half of the forest fires that burned in Michigan. Campfires are frequently the cause of forest fires. Here you can take an active part as a fire fighter. You can make it your duty to see that your campfire is entirely out before you leave it. Bury or drown it. You can make sure that the fire is not built against a tree and that the grass and other vegetation that might easily catch fire is cleared away.

You have probably seen a fire tower. From these towers can be seen the entire country-side for many miles. Many fires are discovered that are more than thirty miles away. But in hazy weather, these towers are not effective and the state has to depend upon you and I and everyone to report every fire we see. The sooner a fire is fought the easier it is to extinguish. Your reporting a small smudge might lead to saving thousands of dollars in timber, wild flowers, and the lives and homes of countless birds and animals.

There are three kinds of forest fires. There is the crown fire that jumps through the tops of trees. This kind is the most difficult to control, but it occurs rarely in Michigan. Then there is the muck or Underground fire

that sometimes burns the year around. The third kind of fire is the ground fire — the kind that most generally occurs. A ground fire burning through grass, underbrush, and trees, is fought with water carried or pumped and with sand shovelled by the fighters. There is a law in Michigan making it necessary for every man to fight fires when called in case of emergency.

Last year, more than three thousand forest fires were reported in Michigan. These fires burned over 53,000 acres. The damage that was done, could not be estimated in dollars and cents. The value of the trees, the destroyed fertility of the soil, changed drainage, burned homes and buildings, all represent a money loss.

But aside from these dollars and cents losses forest fires cause other damages which are often overlooked. These are the losses of our forests as places of recreation, of rest, and of beauty; of our choice scenic spots that attract others to our county; of our wild life in their homes.

MAKE THE PREVENTION OF FOREST FIRES YOUR CONSTANT CONTRIBUTION TO CONSERVATION.
(From Michigan Department of Conservation)

TREE MEASUREMENT

Mark the apparent length of a tree on a "sighting stick" held at arm's length, then revolve the stick 90 degrees (with one end on the base of the tree) and locate the spot the length of the stick away from the base of the tree and the same distance away from you. The distance of that spot from the tree is the height of the tree.

Diameter - Divide the circumference by 3-1/7

SMOKE PRINTS

By Al Lambeau, S.M. Troop 932

The method used is practically the same as the one outlined in booklet #3198 "NATURE COLLECTIONS", page 5.

METHOD

(1) Take a piece of newspaper a little larger than the leaves you wish to print.

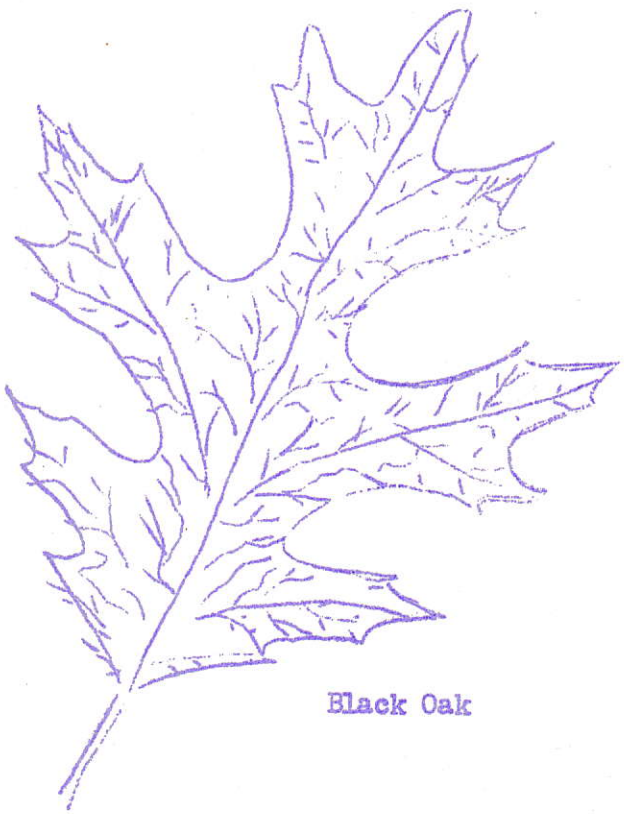
(2) Then cover one side of this paper with a THIN EVEN coat of lard. Cover your finger tips with lard and spread on the paper, rubbing back and forth until it is completely covered with a thin film. DON'T use too much lard. There should be no grease spots — if you have any grease spots, these will show up when you apply the heat from the candle in smoking. Should a spot appear, rub it around with your finger until it is absorbed; your smoke carbon should be dry when ready and not wet or greasy.

(3) Next light a candle, or an oil lamp, and smoke the greased side of the paper. You will soon find the proper distance to hold the flame in order to get the most soot. Move the flame slowly back and forth until the whole side is coated with a fairly heavy black soot.

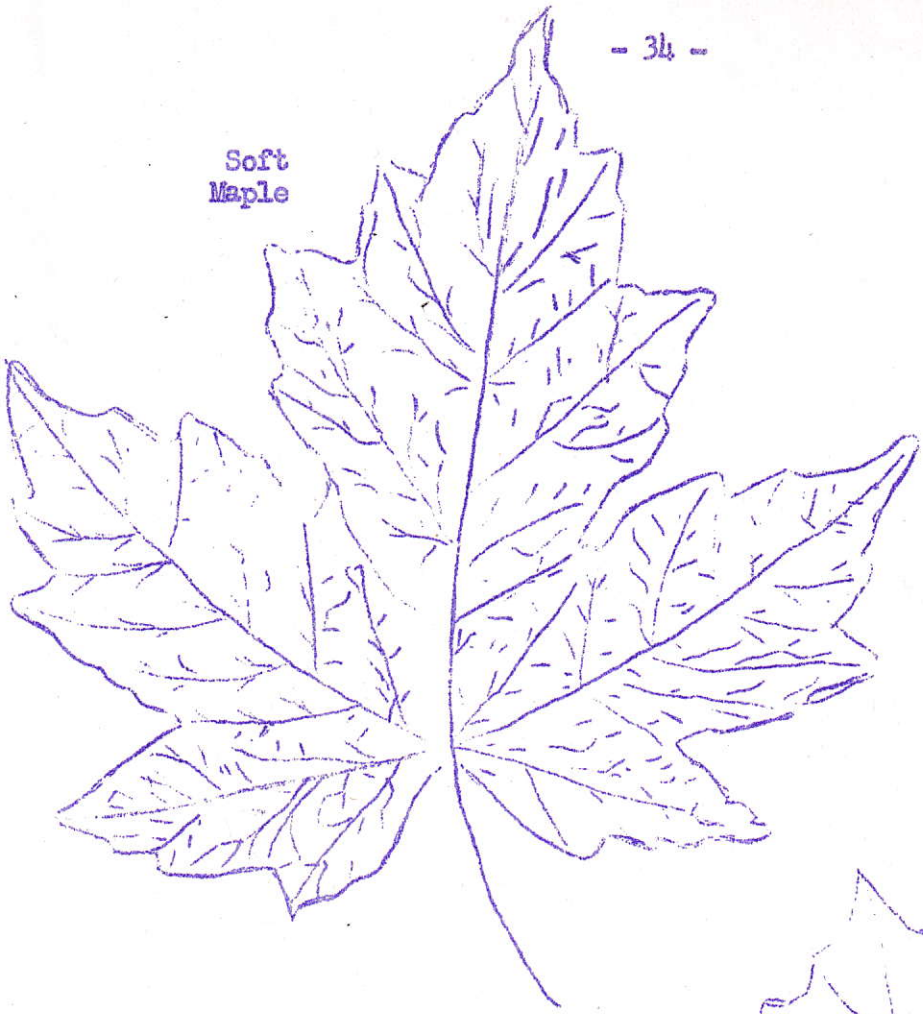
(4) Place your paper on a table soot side up. Then take your leaf, place it on the sooted surface. Be sure and have the underside of the leaf on the sooted surface. Then take a piece of paper (newspaper will do) a little larger than the leaf and place it over the leaf. Hold one half of the leaf firmly with one hand and rub over the other half of the leaf with the other hand. Don't hurry, be sure you have covered all veins and edges. Then repeat operation on the other half of the leaf.

(5) Now the leaf is ready for printing. Place it underside - down on the paper you wish to print. (The paper these samples are on is University Heavy weight size 9x12). Put a piece of newspaper over the leaf, rub with the finger tips and start along the center rib, then rub back and forth from the center rib to the outer edges of the leaf along the general directions of the veins. Also carefully rub the edges, as every spot on the leaf must be pressed in order to print. In No. 4, it doesn't matter if the leaf should slip while being rubbed, but now while you are making the final print, you must be careful to hold the leaf firmly in place as a slip will blur.

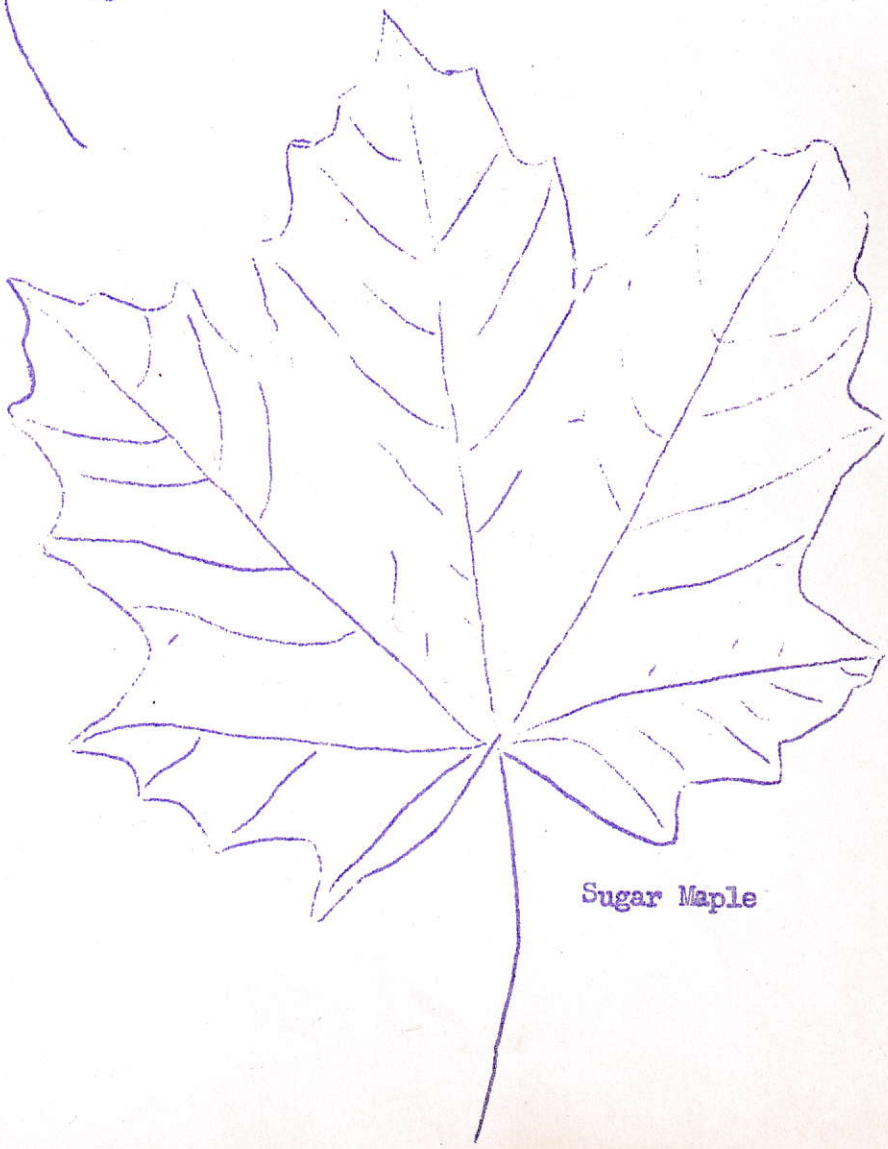
You may use the smoke carbon several times and may re-smoke it.



Black Oak



Soft
Maple



Sugar Maple

GEOLOGICAL HISTORY AND ECOLOGY

Dr. V.O.Graham

The glacier time has affected nature around Owasippe as everywhere else. The most evident effect is that of the glacier lake.

Crystal Lake may be thought of as a great chunk of clear ice, surrounded by ice full of gravel, clay, and other materials in the glacial mass. The gravel laden ice melted more rapidly than the clear ice and laid down the shore around the lake by the deposit of gravel around the ice. The clear ice left no deposit, and therefore in melting filled the depression with water, forming the lake.

The same type of explanation fits for Big Blue Lake. There are four general very remarkable situations, and each of these situations represents a history covering many centuries.

Around Crystal Lake on the hills is a pioneer situation. What we mean by this is the changing of plants from the very dry, sandy situation gradually towards one where we have a climax forest. In any climax forest at this latitude, we may expect to find beech, hard maple and hemlock, all of them, or sometimes just one of them as the principal tree.

On the hills around Crystal Lake the situation is so new as far as plant changes are concerned, that the two pioneer trees -- white pine and black oak -- are the predominant ones. In this succession of trees, white pine comes first on sand that has been stabilized by the growth of grass and short vegetation.

Pine seeds will not germinate in the shade of pine trees. It cannot therefore, succeed itself. Black oak acorns will germinate in the shade of pine trees, but will not germinate in the shade of black oak trees. This then, explains why pines are replaced by black oaks and in time black oaks will be replaced by climax-trees.

Of course destruction and construction are constantly going on. Destruction and construction around Crystal Lake are so nearly equal that it seems likely that the black oak and the white pine may be dominantly present without any advance to the climax-forest for many centuries to come.

THE HEADWATERS

The second situation is found at the Headwaters. There cold springs continually bathe the soil, keeping it much colder than the usual soil of the region. The temperature is very close to that of the Northern Minnesota soil. As a consequence, the plant life and animal life are like that of the region several hundred miles farther north. How did it happen that this condition should exist?

During glacier times, the ice such as is present in arctic regions was in this region. The movement of the ice to this region and away from this region was very slow and the plant life migrated southward ahead of the ice. Then as the ice melted back to the north, the plant and animal life migrated northward. As the far northern plants crossed this region, some found the habitat of Head-

waters so favorable because of cold springs that they have remained there, while passing out of existence in all other regions about. This has left an interesting and peculiar group of plants.

BOGS

The next situation is the bog. In a region near the Wilderness Camp is a tamarack bog. This represents a beginning stage from the bog gradually changing from one association of trees to another until a climax-forest is reached. In the tamarack bog, 250 steps above the ice house near Wilderness Troop Camp, is a pioneer bog situation with pitcher plants, sun dew, bog holly, sphagnum moss and cranberries as the herb and shrub group. Coming into this, are tamarack trees.

The tamarack tree occupies a position in the bog in the succession that corresponds to white cedar. The white cedar belongs in much more northern bogs than the tamarack.

This bog then carries us in succession from the sphagnum moss through to the tamarack tree.

At the Fire Tower is a white cedar bog. In this bog we have the stages from the white cedar to the climax-forest. Here is the next stage beyond the white cedar which contains the red maple and yellow birch.

This stage is the pre-climax stage. Hemlock and beech climax-trees are present in great numbers in this particular bog. A study of the combination of the tamarack bog near the ice house and the cedar bog near the Fire Tower gives us a complete story from the pioneer bog to the climax-forest.

CONCLUSION

In conclusion, it may be said that regardless of whether we start at the very dry, sandy situation, or the very wet lake situation and carry the life through the series of stages, we always arrive at the same place--life in a climax-forest composed of beech, hemlock and hard maple.

The Owasippe region is abundantly full of remarkable illustrations of these very interesting successions.

OWASIPPE LAKE

Owasippe Lake is very nearly circular. Due to its shape it shows the various effects of nature on a lake. The origin of Owasippe Lake is associated with the Glaciers. The present condition of Owasippe Lake may be explained by the effects of sunshine and shadow. From a boat in the center of the lake observation will show you that half of the shore line is green and the other half is barren. If you were to think of the green shore, which is a half circle, as a bow, put an arrow in the bow and shoot it, it would hit the sun at the hottest part of the day. The reasons for this are connected with the rays of the sun meeting the opposite shore at a vertical angle. They hit the shore nearest the sun at a slant. Therefore, the one shore is green and the other shore is not so green. The effect of this heat causes the water to be evaporated from the one side while the side towards the sun remains moist. The moist conditions may be seen in the green line of plant growth. What effect has this had upon the lake? The side of the lake on which plant growth is great is rapidly filling. For that reason, the lake is very shallow towards Camp West, but remains very deep on the other side.

Dr. V. O. Graham

INSECT LIFE

To obtain a Merit Badge for Insect Life (Entomology), a Scout must:

1. Watch the insects at a pond side or brook, ant's nest, clump of flowers, wasp's nest, rotted log or other center of activity, for three hours. Make notes on what he sees.

2. In the field — or if this is impossible, from mounted specimens — tell to which order insects of six different orders belong. Explain how he recognizes each order.

3. (a) Make a spreading board and three specimen boxes, (b) collect, mount and label 25 different kinds of insects including 3 beneficial and 3 harmful to man. Exhibit his collection at a Troop meeting.

4. Know something about the life histories and habits of the twenty-five insects collected in Requirement No. 3; that is, where each is likely to be found, what it eats, the different stages of its life, how it sees, hears, smells, feels (if it does these things), and with what plants, animals, birds, and other insects it is associated.

COMMON INSECTS FOUND AROUND OWASIPPE, MICHIGAN
(from the collection of E.F.Schmidt)

1. Cecropia Moth
2. Imperial Moth
3. Sphinx Moth
4. Tiger Swallowtail Butterfly
5. Spice Bush Swallowtail Butterfly
6. Red-Spotted Purple Butterfly
7. Monarch Butterfly
8. Cabbage Butterfly
9. Dogface Sulphur Butterfly
10. Silver-Bordered Fritillary
11. Silver-Spot Butterfly
12. Comma Butterfly
13. Giant Dragonfly
14. Skimmer Dragonfly
15. Brown Skimmer Dragonfly
16. Water-Prince Dragonfly
17. Harvest Fly
18. Walking Stick
19. Sawyer Beetle
20. Lesser Prionus Beetle
21. Caterpillar Hunter
22. " "(C. Calidum)
23. Bombardier Beetle
24. Predaceous Diving Beetle
25. Pinching Bug
26. June-Bug
27. Virginian Burpested
28. Tiger Beetle
29. " "
30. Dogbane Beetle
31. Milkweed Beetle
32. Stink-Bug
33. Lady-Bird
34. Grasshopper
35. Robber Fly
36. Mourning Cloak Butterfly
37. Ant-Lion
38. Underwing Moth
39. Giant Waterbug
40. Goldsmith Beetle
41. Rhinoceros Beetle

Authority - Field Book of Insects — Lutz

Camp is an ideal place to obtain a Merit Badge for Insect Life. No attempt will be made in these notes to cover any of the technical side of this subject.

At first sight the requirements for this badge look terribly tough to the boy, but the collection, after all, is the hardest thing to make and this is not difficult at camp. Boys always like to catch things and with a supply of insect nets and a few killing jars, a Naturalist should have no difficulty in helping a boy start his collection.

On a warm night when the moths are flying, the Naturalist should take his group of Entomologists, a liberal supply of mosquito dope, some nets, and a bright Coleman lantern, and let the light attract insects in some clearing in the woods or along the lakeshore. This method of collection is not only effective but has something of adventure about it.

(The Merit Badge booklet on Insect Life is an excellent ereference for this badge.)

REPTILE STUDY

To obtain a Merit Badge for Reptile Study, a Scout must:

1. Make sketches from your own observation, showing markings and color patterns of seven reptiles and three amphibians found in your state, and record the habitat and habits of each species.

2. Know approximately the number of species and general distribution of reptiles and amphibiams in the United States.

3. Describe how reptiles and amphibians reproduce themselves.

4. Give ten superstitions about snakes and a correct explanation in each case.

5. Describe in detail six poisonous snakes and lizards found in the United States, and their habits. Name those found in your own state. Demonstrate first aid treatment for snake bite.

6. List ten reptiles or amphibians useful to man either as food or in controlling insects or rodent pests, and state how food is taken. List food habits of each species. If there are laws in force in your state for their protection, tell the reasons each is protected.

7. From actual observation describe how reptiles move forward. Describe the functions of the muscles, ribs and belly plates.

8. Describe the outstanding differences between (1) alligators and crocodiles; (2) toads and frogs; (3) newts and the other species of salamanders; (4) salamanders and lizards.

9. Maintain in a terrarium, aquarium or properly constructed cage, one or more reptiles or amphibians for at least a month, recording the food accepted, the method employed in eating, changes in color or skin shedding, and general habits

during this period.* OR Keep the eggs of one amphibian or reptile from the time of laying until hatching and record the length of time required for hatching, and method of hatching.

10. Go out at night and identify three kinds of toads or frogs by their voices. Stalk each with a flashlight and discover how each sings, and from where (water, in tree, etc.). Imitate for Counselor the song of each. OR Take a recognizable photograph of a turtle, a snake and an amphibian. Photographs must be from living specimens. OR Give a brief, informal talk to a small group on reptiles or amphibians, using at least three living specimens for illustration purposes.*

*The Scout should use non-poisonous reptiles only in fulfilling this.

OWASIPPE REPTILES

Hog-Nose Snake
Grass Snake (H.B.)
Blue Racer
Black Snake
Milk Snake
Queen Snake (?)
Water Snake (common)
Ribbon Snake
Garter Snake
Massasauga Rattler
Little Brown Snake
Blue-Tailed Skink
Musk Turtle
Snapping Turtle
Wood Turtle
Blanding's Turtle
Box Turtle
Map Turtle
Western Painted Turtle
Soft Shell Turtle
Cumberland Terrapin
Spotted Turtle

OWASIPPE AMPHIBIANS

Mud Puppy
Newt
Jefferson's Salamander
Red-backed Salamander
American Toad
Fowler's Toad
Swamp Tree Toad
Common Tree Toad
Wood Frog
Bull Frog
Green Frog
Pickerel Frog
Leopard Frog

To the Naturalist:

With only one exception, these reptiles are all useful and should be preserved. It is your job to teach our Scouts that snakes should not be killed.

CROCODILIANS

Alligator: Range - Rivers and swamps along the Atlantic Ocean and the Gulf of Mexico from North Carolina to the Rio Grande. It has a "U" shaped nose -- grows to a length of about sixteen feet.

Crocodile: Range - Extreme southern Florida and possibly Texas. It has a "V" shaped mouth and grows to a length of about fourteen feet.

These crocodilians are carniverous and eat fish, frogs, mammals and birds. They lay about thirty or forty eggs sometime in June in a hole which they dig in sand or decaying vegetation. The eggs are then buried in sand and vegetable debris and are left to hatch, which they do in about 8 weeks. The eggs are oval, hard, and white. They are about three inches long. Alligators grow about a foot a year.

POISONOUS SNAKES

Gila Monster: Found in the southwestern deserts of the United States. Mottled orange or reddish and black color. A heavy and squat body with a fat tail.

Coral Snake: Slim - about three feet long. Markings are red, yellow, black, yellow -- in that order. It has a black snout. The grooved teeth are solidly fastened in the front of the upper jaw. The poison mixes with the saliva. It is found in the southeastern part of the United States.

Water Moccasin: It is a pit viper with a stout ugly body about 4 feet long. It is a dull olive color with wide, blackish, traverse blotches on back and sides. The inside of the mouth is whitish, so it is sometimes called "Cotton-mouth". Their northern limit and range is about central Illinois and Indiana. This snake is almost always found near wet places.

Copperhead: This snake is pale brown with reddish brown, dumb-bell shaped "saddles" across its back. The head is copper-colored. It is a stocky snake and grows to a length of about three feet. It is a pit viper. The range is east of the Mississippi and south of Central Illinois and southern Massachusetts.

Rattlesnake: The Massasauga is colored slaty gray marked with a chain of deep brown blotches. It is a small, stocky snake. It is a pit viper with rattles on its tail. It is found in the central and lake states.

The heads and fangs of the last three species are somewhat similar. The heads are roughly triangular. The fangs are two hollow teeth, which when the mouth is closed, are hidden above some membrane in the roof of the mouth. They swing down into striking position when the mouth is opened. The upper ends of the fangs are connected to a sac of poison in the head near the eye. The "pit" is between eye and nostril. Poisonous snakes are not aggressive, but if they believe they are being attacked, they speedily assume a defensive coil, and can strike with accuracy about one-third of their own length.

Snakes feeding on rodent pests: Blue Racer, Black Snake, Milk Snake and Water Snake.

Snakes capture their food by biting or squeezing, or both. Some species poison their prey. The victim is then swallowed whole -- usually head first. Snakes can stretch their jaws and bodies to accomodate quite large animals. Snakes are useful to man because they kill harmful rodents and insects.

Snakes born from eggs: Blue Racer, Black Snake, Hog-Nose Snake, Milk Snake, Grass Snake.

Snakes born alive: Water Snake, Garter Snake, Queen Snake, Ribbon Snake, Rattle Snake.

A snake sheds its skin because the skin is worn out or damaged. The skin loosens all over the body, and starting at the head, is peeled off inside out. A healthy snake sheds about once in two months. (The Rattlesnake gets another rattle every time it sheds). Just before the skin is shed, the scale over the eye loosens, letting air in between the old and new eyes. This makes theeye look milky, and the snake is partly blind.

A snake both hears and feels with its tongue.

	Snake	Lizard	Turtle	Crocodile
Eyes	No lid	Lid	Lid	Lid
Ears	Inner	Outer	Outer	Outer
Teeth	Many	Many	None	Many
Heart				
Lungs				
Limbs	None	4,2,0	Four	Four
Tails	Long	Long	Short	Compressed
Scales	Scales	Scales	Shell	Plates

TURTLES

Turtles lay their eggs in nests which they dig in the sand sometime during June or July. The number of eggs varies with the species, ranging from four to thirty-five. The eggs are round or oval, white, and in most cases have a tough leathery shell. The eggs hatch in two to three months. Of the Owasippe turtles, the Snapping Turtle, the Wood Turtle, and the Box Turtle are edible.

LIZARDS

The young of the Blue-tailed Skink are produced from eggs. The female Skink will lay from six to fourteen eggs in decaying wood. The female stays with the eggs, which are laid mostly around the first of July. They hatch in about a month. The Skink's food is mainly insects. If a Skink is grasped by the tail when captured, the tail will break off but will re-grow in time.

Mammals -- Man
Birds -- Eagle
Reptiles -- Alligator
Amphibians -- Frog
Fishes -- Trout

Reptiles hibernate because they are cold-blooded, and cannot endure cold weather (they become inactive). Turtles bury themselves in mud. Snakes get together in rock crevices or hollow trees. Reptiles hibernate during the winter or cold weather period.

FIRST AID FOR SNAKE BITES

1. Apply tourniquet immediately above the wound, i.e., between the bite and the heart.
2. A cross-cut incision, one-half by one-half inch, should be made with a sharp knife or razor blade over each fang mark, or preferably to connect the two fang punctures. The cut must be from one-eighth to one-quarter of an inch deep -- deep enough to insure free bleeding.
3. Apply suction for at least one-half four, either with the mouth or by a bottle, or by some method which will induce free bleeding.
4. Keep the patient quiet and treat for shock, but go light on stimulants.
5. Send for a doctor.
6. KEEP THE WOUND CLEAN.

WEATHER

To obtain a Merit Badge for Weather, a Scout must:

1. Have a general knowledge of composition of the air, referring to both constant and variable elements of the air, and what function each performs.

2. Develop quite broadly the subjects, moisture, fog, hail, rain and snow.

3. Explain points connected with electrical and optical phenomena in the air, i.e., have a knowledge of the following: rainbow, mirages, looming halos, Northern lights, St. Elmo's fire, lightning and thunder. Describe as many of the above as you have seen.

4. Have a knowledge of the use and construction of and demonstrate your ability to read a barometer, thermometer, anemometer, psychrometer and rain gauge. Have constructed a weather vane. Know the weather signals or storm signals.

5. Outline in writing a simple statement of the climate of the United States and of your own State.

6. Explain the value of weather prediction. Write a brief account of the United States Weather Bureau, stating what daily, weekly and monthly publications are sent out by this Bureau. Be able to interpret the charts and graphs contained in their publications.

7. Keep a daily record for a month of the following: Dew or frost in the morning; at a specific hour each day (this hour must be the same every day), the direction of the wind, the temperature, kind of clouds (if any) in the sky. (State if it rains or snows at this hour.)

8. Name some places where, during severe thunder storms, the danger from lightning is great, some places where the danger is small.

Since the technical requirements for this Merit Badge are so amply covered in the Weather Merit Badge pamphlet, it would be fruitless duplication of work to repeat the information here.

The study of Weather can be made a very vital thing at camp by establishing a very graphic chart of the weather as the days go by, this chart of course to be kept up-to-date and recordings made by the Weather Merit Badge class during the day and "the guard" during the night.

ZOOLOGY

To obtain a Merit Badge for Zoology, a Scout must:

1. Make five field trips of at least two hours each (preferably at different seasons) to observe wild animal life. Keep records of such trips, listing all animals seen, with date, place, nature of locality and observations of animals and their habits. (Photographs, sketches, track casts, etc., will add to the interest of this record.)

2. Using the "keys" of the modern system of classifying animal life, show ability to classify at least five animals of different phyla which you yourself select.

3. Find out the life processes that are common to all animal life (birth, self protection, feeding, breathing, etc.). Keep record from personal observation of the life cycle and habits of at least two animals of different phyla.

4. On a map of your locality (showing such things as forests, plains, streams, marshes, arid areas, etc.) indicate animals found in each habitat. Know what is being done in your State to protect wild animal life.

5. Carry out one of the following projects: (a) Keep a young animal (completely weaned from mother) such as a squirrel, white rat, rabbit, or guinea pig for at least three months. Keep a weekly diary of its habits, food requirements, gain in weight, general health, etc.; OR (b) maintain an aquarium or "toad pen" for at least three months. Stock from local ponds, streams, or marshes. Watch development from egg on, of frogs, toads, turtles, fish, or whatever animal you have chosen for special observation. Keep record of life cycle and habits; OR (c) submit at least ten photographs or sketches based on your own observation of microscopic animal life in the field for a period of at least three months. Present at least three properly prepared slides of mi microscopic life.

NOTE: Animals, in the zoological sense, include all living organisms other than plant life, from amoeba up through man. However, since birds, snakes and insects are covered in other Merit Badge subjects, choose other examples of animal life for these requirements.

THE PHYLA OF ANIMALS

1.	Chordata	"cord" (Notachord)
2.	Arthropoda	"joint-foot"
3.	Mollusca	"soft-bodied animal"
4.	Molluscoidea	"Mollusk-like"
5.	Echonodermata	"Hedge-hog skin"
6.	Annulata	"ringed-worms"
7.	Trochelminthes	"wheel-worms"
8.	Nemathelminthes	"thread-worms"
9.	Platyhelminthes	"flat-worms"
10.	Coelenterata	"hollow-intestines"
11.	Porifera	"pore-bearing"
12.	Protozoa	"first animal"

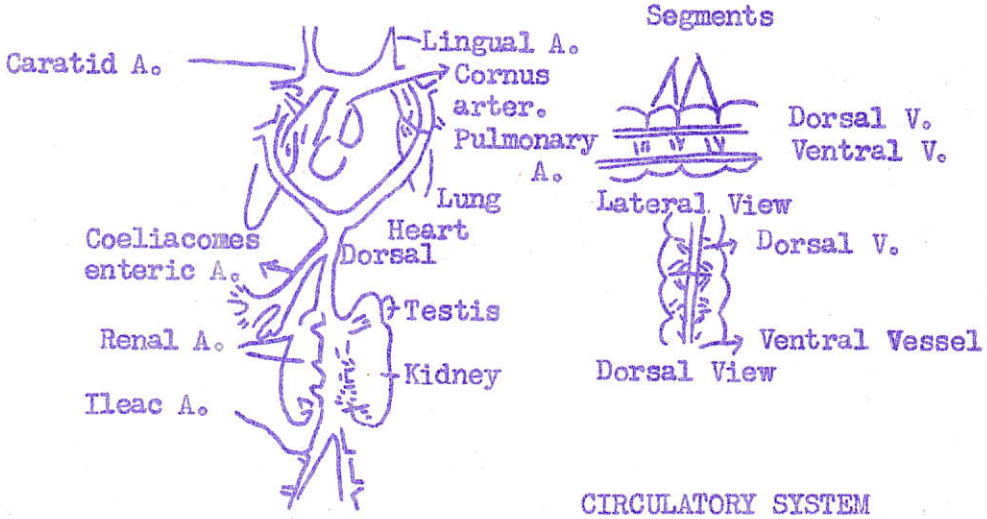
A vertebrate is an animal having a backbone. This backbone may be made of either bone or cartilege, or both.

A dog is an example.

An invertebrate is an animal which lacks a backbone, although it may have an exoskeleton, like the oyster or the sponge.

ANIMAL	PHYLUM	CLASS
Bees	Arthroped	Insecta
Crayfish	"	Crustacea
Worms	Annulata	Chaetropoda
Snails	Mollusca	Gastropod
Spiders	Arthropod	Arachnida
Sponges	Porifera	
Cats	Chordate	Mammalia
Birds	"	Aves
Snakes	"	Reptiles
Bats	" "	Mammalia
Jellyfish	Coelenterata	Scyphozoa
Corals	"	Anthozoa
Oysters	Mollusca	Pelecypod
Butterflies	Arthropod	Insecta
Amoeba	Protoza	Sarcodina
Paramecium	"	Infusoria
Man	Chordata	Mammalia

ARTERIAL SYSTEMS OF FROG AND EARTHWORM



ARTERIAL SYSTEM OF A FROG

CIRCULATORY SYSTEM OF AN EARTHWORM

A fertilized egg is an oospore in which materation and fertilization (or impregnation) have taken place; that is: Ovum plus Sperm equal OOsperm.

After fertilization, segmentation of the nucleus begins. The nucleus first divides into 2 (binary fission) then into 4 cells; then into 8, and so on, until finally the mass of cells develops a layer arrangement. It is from these layers that all of the parts of the final metazoan develop.

Zoology is that branch of Natural History which deals with animals.

GENERAL IDEAS

Use the "Whosit" box or jar where Scouts can see it and talk about it and keep changing the subject frequently.

Try to start boys making their own personal collection.

How about an Aquatic Life trip for specimens of water creatures?

A half-barrel makes a good aquarium.

How about a weather station properly labeled and with a big thermometer up on the Messhall porch?

A rock and fossil collection should be started.

Try this on the boy, who apparently must kill every frog he sees - etherize the frog and dissect it, showing the numbers of kinds of insects eaten, thus illustrating its usefulness.

Mushrooms, if dried in hot sand, will retain their original shape.

Three or four leaf presses will facilitate the collection of flowers and leaves.

A collection of casts of the various tracks of animals found around camp should help the boy who "thought he saw a bear track this morning".

Artificial ant nests and mos quito breeding cages are always interest provokers.

The Naturalist should cooperate with the handicraft man in the bird-house requirement for Bird Study Merit Badge.

Another place for cooperation -- might be a fishing contest, the fish to be caught on artificial plugs made by the boys in camp.

Then, too, there is always a big field in nature lore photography. How about a photo contest?

Indian lore should always be hooked up with Nature Lore -- may we recommend "The Book of Indian Crafts and Indian Lore" by Salomon.

There are some excellent nature games in the Scout publication "Nature Notes".

You will notice in the Michigan Game Laws that all hawks and all owls are condemned. Enough Scout letters urging that the beneficial hawks and owls be protected might eventually cause the blanket indictment to be lifted.

The author would once more like to repeat his statement that this book is not meant to be a complete authority on Owasippe Nature Lore. It is purposely put in loose-leaf form so that you, Mr. Naturalist, can add things to it. We feel that this book as a compilation of all our observations will be of definite value to the Naturalists and Scouts of the future.

MORE "IDEAS"

Out West in our great National Parks, there is held during the tourist season, almost every evening, a giant campfire, to which everyone camping in the neighborhood is invited. One of the reasons for the campfire is, of course, fun and entertainment, but the highlight of the evening is always the "Campfire Talk" given by one of the Ranger-Naturalists of the National Park Service. This talk, which is always humorous and rarely technical, is generally on some phase of the natural history of the area. I have had the pleasure of listening to many of these campfire talks, and I wonder if our own Naturalists couldn't do the same thing at Owasippe?

In the Museum in Rocky Mountain National Park there is one of the cleverest ideas for exhibiting live wild flowers I have ever seen. It's a half-log, about six or eight feet long and perhaps twenty inches in diameter, made into a table but with the rounded bark-covered side up. Spaced at regular intervals along the top of this "table" are holes bored deep down into the wood, and set in these holes are large test-tubes, each filled with water, and each containing a single blossom of a wild flower found close by in the mountains. Signs and labels tell you what the flowers are and suggest that "since they are already here and identified, there is really no point in picking others out in the woods".

They say that by the use of much sandpaper, glass and elbow-grease it is possible to polish the cross-section of a big log so that the annular rings jump right out at you. Of course, if the date of cutting of a tree is known, then each ring can be located in time quite easily. You know -- "In this year Scouting was founded": "The tree was this old when the Civil War broke out"; "Here are the 'revolutionary' rings"; -- and lots of other interesting signs.

According to Bernie Thal, pressed leaf and flower specimens, already mounted on paper of course and labeled, can be displayed quite effectively on a wall by setting them against a wide board with molding at top and bottom. A single wire running laterally along the middle of the board would hold the specimens in place.

Andy Whiteford, the Naturalist at Stuart, mentioned several things in his report that looked good. One of them is an attractive bulletin board. Another one is a garden of mosses and small plants. Another particularly unusual one is the idea of making plaster casts of insects and then painting the casts. He also reports the success of "constellation cans", made by one of the Scoutmasters who punched out the shape of a constellation in the bottom of a tin can. Aquariums at Stuart proved very successful. All through his report runs the idea that bears constant repitition to any Naturalist -- "Live things are much better than mounted specimens."

Since plaster casts are likely to be rather messy-looking things, we wonder if a set of standard forms might not be better than the haphazard collection of cardboard, etc., that the Scouts normally use. Camp Beard, some years ago, tried a stunt that proved particularly effective -- inch and one-half strips were cut from the tops of Number Ten tin cans, greased and used for plaster cast forms. They made a smooth-looking job.

The Naturalist at Camp Kiwanis suggests that a point of interest about the star "Arcturus" is the fact that its light was used to open the 1933 World's Fair at Chicago. Why? (Reason: the light from this tart that reached Chicago in 1933, left the star in 1893).

STILL MORE "IDEAS"

A careful study of the material given Mr. Nichols by the Treasure Island Naturalist indicates the following suggestions that I believe would be very valuable to us. Rather than trying to rephrase them I shall quote them verbatim with any comments or ideas that suggest themselves to me.

SECTION OF LOG

Section, about 4" thick, was sawed from a large fallen red oak, near its base. One surface was planed smooth, then finished with glass and sandpaper and varnished. Count of the annual rings was made and, bases on the known date of the tree's death, the dates when the several rings had been added were fixed. To certain rings (those added in 1812, 1861, 1892, etc., a tiny label was affixed, bearing the year, and from each of these a string was run to a chart on the table, on which was indicated the event in American history which took place in that year. (comment - see also page on More "Ideas")

BIRD STUDY NOTEBOOK

A stuffed bird is set up about eye-high for a Scout. From the main parts such as head, nape, back, rump, tail, wing-bars, breast, belly, etc., strings are hung, each terminating on a sample page from a Scout notebook hung on the wall, on which entries have been made concerning these parts of the bird.

PLANT RELATIONSHIPS

In a shallow pan, covering the whole of a table top, smaller pans are placed. In these smaller pans are placed or planted such diverse types as algae liverworts, mosses, horse-tails, ferns and flowering plants. The entire large pan, between the smaller ones, is filled with living moss. Suitable labels draw attention to the line of evolutionary development, but in simple language.

PEEPOSCOPE

This consists of a circular stand or table top, about 18" diameter, so mounted on a large table that it may be revolved horizontally. Near the edge are fastened little white pine blocks, to which specimens and labels are pinned. An ordinary reading glass is mounted on the large table in such a way that one after another of the specimens may be brought into focus by turning the stand. Effort is made to get the wording of the labels "snappy" and to avoid mere names.

MICROSCOPES

Two microscopes are used, a low power binocular and a relatively high power monocular. It has been found advisable to enclose each in a glass box, made from old photographic plants, joined with adhesive tape. The eye-pieces only protrude, and unwise "monkeying" with adjustments is correspondingly discouraged, while light is readily admitted through the glass. Slides changed daily.

INSECT CAGES

A row of these, each about 5" x 5" x 4", with glass fronts, and screened backs, is set up to contain live insects. The insides of the cages are painted

white, and a large magnifier is so fastened on a horizontal wire that it may be slid from in front of one cage to another. Mortality is high, daily replacements are necessary in many cases. By omitting the screened back in the case of small net of paper wasps, the insects continued to build, travelling in and out while the Scouts watched.

PRINTED SIGNS

The use of cardboard signs with attractive wording has been found helpful. Such captions as "Did you ever stop to think that the only important natural light we ever see is starlight? Ask the nature men." "A toad does not give warts -- he keeps 'em". "Believe it or not -- a star is not star shaped". "A robin's breast is not red". "A snake's tongue is not a stinger", etc., etc. The idea is snappy stuff that will raise questions in the Scout's mind. One sign bears photos and facetious lifehistories of the nature staff, so that the new boys may identify the man then on duty in the museum and call him by name.

SNAKE EXHIBITS

Snake cages are constructed of wood, approximately 12" x 12" x 24". The front has a removable glass panel (to facilitate cleaning) and the lid is a frame, covered on the inside with wire screening, the lid hinged and fastened with two hasps, secured by small padlocks. Interior of box is arranged by use of flat stones, sod, earth, or other materials, to imitate the snake's natural habitat. Drinking water in a shallow pan is made available. Species are segregated and are confined mainly to local species.

For handling poisonous snakes, a "snake stick" is used which consists of a stick like a broomstick, in the end of which is inserted a piece of 5/16" round iron bent to form a right angle. With it the snake can be lifted for transfer, stones can be turned over while uniting them, or the head can be held down against the ground, while the hand grasps the neck sufficiently close to the head so that the snake cannot turn and use his fangs when lifted.

MYSTERY BOXES

These consist primarily of a box, having a slit or peep hole, and an electric push button near by. The Scout peeps in the hole, presses the button and the contained specimen and label are illuminated by a concealed light. Boys will stare long through a peep hole at an object which, if laid openly on the table, would be utterly unnoticed. This scheme is capable of almost unlimited development. (These would have to be along the window because of our lack of electric light).

AQUARIA

These range in size from the big terraquarium, nearly six feet long, to the little, shallow, bowl-like affairs from the ten-cent store. The terraquarium is constructed in four sections, each separated from the next by a glass partition. Each section is set at a lower level than the one preceding it. In the highest level is laid out a habitat to imitate conditions and life on a dry hill-top, the next simulates a wet woods, the third is a bit of swamp and the fourth a lake. The partition between the last two is sufficiently low that the swamp life may get into the lake and vice versa.

The contents of the smaller aquaria are of course responsive to our local fauna, the hardier species of fish, salamanders, newts, frogs, tadpoles, crayfish, whirligig beetles and other aquatic insects, etc., etc. Naturally segregation is necessary so that the weaker species may not become a Roman holiday for the more voracious. The labels avoid mere names, habits and relationships are indicated in boy language.

MUD ALBUM

On the floor, in a corner of the museum, and fronted by prone legs, is a layer of mud, bearing "manufactured" tracks of local animals and birds. A printed sign encourages the Scouts to make similar "albums" near their own sites, to study the record of the wild folk left there during the night. (This would fit in very well with our "tracking kit").

GENERAL

On the floor, in black paint, are stencilled tracks of squirrels, rabbits, skunks, etc. - (Swell)

Seats at the tables are provided to encourage lingering.

From a paragraph in another of the Treasure Island Letters comes this quotation. "Strangely enough however, a "nature Hike" is never held, under any circumstances. We have instead - 'Exploration trips' - 'Wading Hikes' - 'Fishing Hikes' 'Safaris' -'Snake Hunts' - 'Mystery Hikes' - 'Tracking Hikes' - 'Dinosaur Hunts' - 'Fossil Hunts' - 'Wanderlust Trips'. It would be hard to find the slightest difference between any of these, or between them and Nature Hikes except that Scouts will not go on Nature Hikes - but prefer an Exploration Hike to a swim any day".
(NOTE: - Naturalists following this line of thought can hardly fail).

NOTE: - Material a little further on leads me to wonder if our method of examining Scouts in Bird Study is so wise. I wonder if perhaps those boys shouldn't take the Naturalist on a Bird Hike rather than the Naturalist taking them on a Bird Hike. In that way their field identification (which after all is the most important thing) could more easily be tested.

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EXTENT OF THE GLACIER

Geologists now think, that where our present lake is there was once a big river, and the Glacier, when it came down from the north, just scooped out the valley of that river to its present proportions.

How far south did the Glacier go? Well, about four or five hundred miles south of us down in Kentucky is a place called "Mammoth Cave". The Glacier didn't quite get there but it came within forty or fifty miles of it, and it spread from the Atlantic Ocean to the Western mountains.

If you were to ask what made the Glacier and how it all started, I am quite sure you would find just as many guesses as you will find Geologists. Frankly, no one knows, but there are lots and lots of theories and ideas on the subject. Anyway, we know for sure that the world has been pretty warm and then it got

terribly cold, and then of course we know it got warm again, and as it got warm, the sun's rays drove the ice farther and farther back toward the north.

GLACIAL LAKE CHICAGO

Naturally, as that ice melted there was a lot of water, and it had to go somewhere; so that by the time the Glacier had melted back to about as far as where we are now here at Owasippe, there was a tremendous lake filling the valley of the present Lake Michigan and overflowing it on all sides. As a matter of fact, the Lake down south of here was sixty feet deeper than it is now. That would put the first six stories of our Loop skyscrapers under water. Marshall Field and Company would be more than half submerged, and you can just imagine where our homes would be.

The Lake didn't stay consistently at this level. It dropped several times and left very distinct shore lines right in the city. As a matter of fact, Clark Street runs right along one of those ancient beaches, so does Ridge Avenue; and to skip back to this part of the country, the next time you go to Whitehall, go down to the bridge over the White River and look to the northeast. The ridge you see in the distance is another ancient beach of old Lake Chicago.

ORIGIN OF CRYSTAL LAKE

A little while back we mentioned that the Glacier had some stones in it. Well, that wasn't all! It had rocks of all sizes. It had all kinds of ground-up clay and sand and pebbles. It had every conceivable kind of debris mixed up in the ice. You see, the Glacier had acted as a gigantic plow and it had just ripped the soil off Canada and brought it down to strew all over the northern part of the United States. That's why Canada north of here is so rocky now.

Occasionally, of course, in this huge mass of frozen stuff there were big chunks -- and by chunks I mean pieces often as big as city blocks -- of clear pure ice, and surprisingly enough, one of those pieces of clear ice is now called Crystal Lake. So early in the season, the fellows who go in swimming here are not far wrong when they say the lake is "ice cold".

Here's what happened. The Glacier, as it melted back, left enormous pieces of clear ice stranded. The dirty ice melted all around it and dropped sand and gravel and rocks, but the clear ice melted right down and left nothing but a round basin filled with water which had once been ice. Of course, there were lots of other pieces of ice left stranded here and there. Some of them, like Big Blue, were larger than Crystal Lake's; and others, like Austin Lake's and Lost Lake's were smaller. Thousands of these pieces of ice were left stranded about this country. They caused the lakes and deeper depressions.

PRESENT TOPOGRAPHY

Our rolling country was caused by the waves and currents in the shallow lake that was over this part of the country, and the ancient sand bars and ridges have now become our hills and dales.

ORIGIN OF WHITE AND MUSKEGON LAKES

Well, you know, that Glacier kept on melting north until finally it got down the Illinois River to the Mississippi, flowed east toward the St. Lawrence River and the Atlantic Ocean. Naturally, the water in ancient Lake Chicago (that's

what Geologists call the old lake) dropped in a hurry when it found a new outlet to the north, so that the lake level was way below what it is now, and the big rivers that enter the lake from western Michigan all carved deep channels. Would any one of you like to guess why we don't see those channels now? Well, I could almost say that you'd never guess it in a million years, so instead of letting you strain your brains on the problem, I'll tell you -- but I warn you beforehand that you have to have a powerful imagination to vision what actually happened!

You know, we mentioned a little while ago that the ice was almost two miles thick -- if a little piece of ice hardly more than a foot square wighs fifty pounds, just imagine what 10,000 feet of ice would weigh! That's right, it's so big a sum that we just can't imagine that muchweight. Actually, however, that ice was so heavy that it bent the crust of the earth down, and of course when the ice melted away, the crust of the earth started slowly to spring back into position. As it rose to the northeast of us, water started to rush back to the southwest, and before you know it, those deep valleys that the rivers had carved were filled up, and we now call them White Lake and Muskegon Lake.

ORIGIN OF THE SHORE DUNES

So you see, our Owasippe country has been pushed up and down; it has been drowned in water and smothered in sand; it has been blown by westerly winds that made those big sand dunes along the lake and a few smaller ones inland; and it has been pretty generally mixed up. As a matter of fact, with such confusion around us, you can't really blame these Scouts who get lost every once in a while -- but that's another story!

WHY OUR LAKE IS BEING FILLED UP

If I remember correctly, one of our earlier questions was, "Why is our lake shallower over toward Camp West on the south side of the lake than it is at Beard and Stuart along the north side of the Lake?" We are pretty sure that once upon a time the lake was a lot deeper than it is now because of that big chunk of ice. What's filling it in? And why is it being filled in on the south side faster than on the north? Well, here again, I'd be pretty safe in betting that no one here can answer that question, and yet this answer is even easier than the one about the Glacier, because this question can be answered in just one word -- "Vegetation". It's easy to see that some of you fellows don't believe that, but it's a fact nevertheless! Vegetation -- tiny plants -- are filling our lake, and the reason the south half of the lake is being filled more rapidly than the north half is that these plants don't like too much direct sunlight, so they grow faster along the south shore where the sunlight is not so direct and where there is some shade.

WHERE LOST LAKE WENT

Some of you are undoubtedly wondering whether our lake will ever be completely filled by plant growth. The answer is "Yes". If you don't believe me just take a look at Lost Lake, or any of our other vanished lakes around here. They have been completely captured by plants who have grown right over the top of them and filled them in. But don't get too worried about it -- the lake will still be here next year! As a matter of fact, it may take a hundred or two hundred years to be completely filled and I doubt very much that any of you fellows will be here to see it.

THE VARYING LAKE LEVEL

Some of our old-timers will tell you that six or eight years ago Crystal Lake was much higher than it is now. That's true; it has gone down some, but according to Mr. Smith, the Michigan State Geologist, there is a regular cycle in the lake levels around here.

OWASIPPE'S NORTHERN PLANTS

This talking about plants brings up that other mystery that we were talking about -- those northern plants that are found down here where they don't belong. Here's the answer to that problem.

We have been talking about the Glacier as it came tearing over this country like a tornado. Actually that's not true at all because it came very slowly. The winters just got a little longer and the summers got a little shorter, and as the summers got shorter, the animals and plants retreated southward toward the warmer country; so that by the time there weren't any more summers, and the ice king ruled supreme, all of the plants that had occupied this part of the country had retreated far into the southland. For thousands of years they lived down there, each plant choosing the conditions that it liked best to live under, until finally, when the ice began to retreat back toward the north, plants began to creep along toward the north too. We know that the plants we mentioned before like cool shade and cold water, so that when the ice had gone back into the north, and the northern plants had gone as far north as our part of the country, they found a spot they liked -- a spot where there is plenty of shade and where they could dip their feet into icy cold water. We know this spot as "The Headwaters". So a little colony of them remained there while the rest of the family went on north to Northern Wisconsin and Canada.

You are going to ask me how plants can possibly travel. That's really not hard at all, if you allow them plenty of time, for you see each year a plant produces a crop of seeds. These seeds are scattered in all directions. Many of the seeds would fall to the north of the parent plant. They grew better there and in their turn produced seeds that would continue to grow toward the north. Get the idea? Besides the Headwaters, there are several cold swamps up near Big Blue Lake where you will find northern plants also.

FOSSILS

Well, I guess that just about cleans up all the questions we asked, doesn't it, fellows? That is, all but one of them. That one about the stone honeycombs -- but that's really another story. I'll just leave these few facts with you. Those little pieces of honeycomb stone are really the fossilized skeletons of corals that once lived in the warm ocean that overlaid this whole part of the country. Why, there was actually coral -- something that we think of as a tropical animal -- living and growing way north of here, for of course most of the fossils we find around here were brought down from Canada by the Glacier. How long ago did they live here? Well, quite some time!! Stretch your imagination around this figure. Geologists think that those corals were growing in that warm ocean just about 136 million years ago -- that's right, 136 million.

So, when you find fossils around the gravel pits, treat them with the respect due their age!

THE BIG REPTILES

Yes, and if it hadn't been for the Glacier, we'd find some real he-man sized fossils around here. For instance, bones so large that it would take half a dozen husky fellows to carry just one of them! If you think that perhaps those bones belonged to the ancient reptiles, you are absolutely right, for dinosaurs -- plenty of them -- did roam this part of the country. Of course, their fossilized bones were all scraped up and dumped elsewhere by the Glacier, and perhaps it's just as well, for it would be a pretty terrible thing to have the camp haunted by the ghosts of those old dinosaurs, for they ranged in size all the way from little fellows just a couple of feet long to perfectly enormous beasts more than 100 feet long who weighed pretty near as much as a small herd of elephants. The prize of their company, of course, was old "Tyrannosaurus Rex", the "king of the tyrants", who was 50 feet long and weighed more than an elephant, and whose head would have towered up among those tree tops 20 feet from the ground. But then, as I said before, that's another story.

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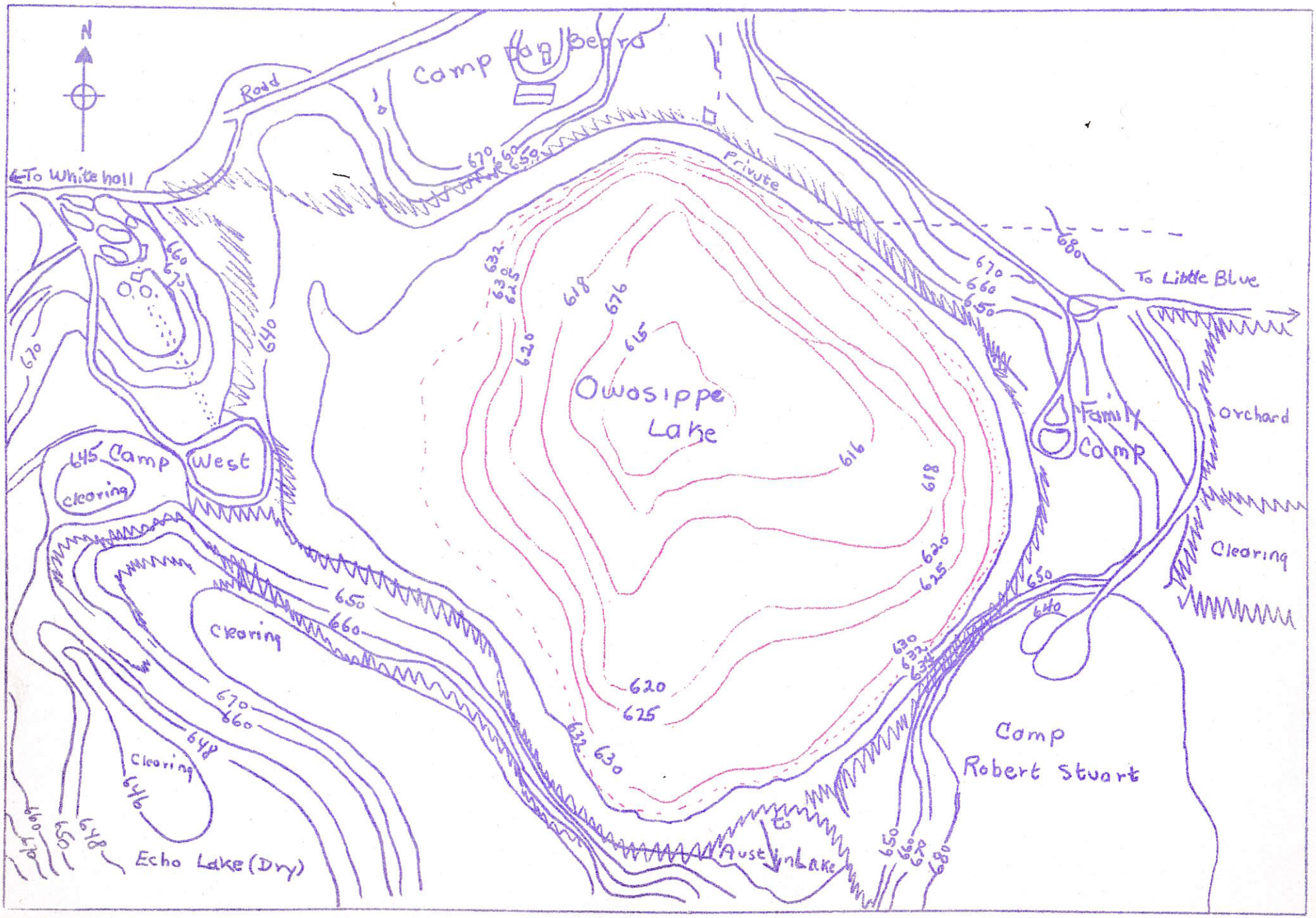
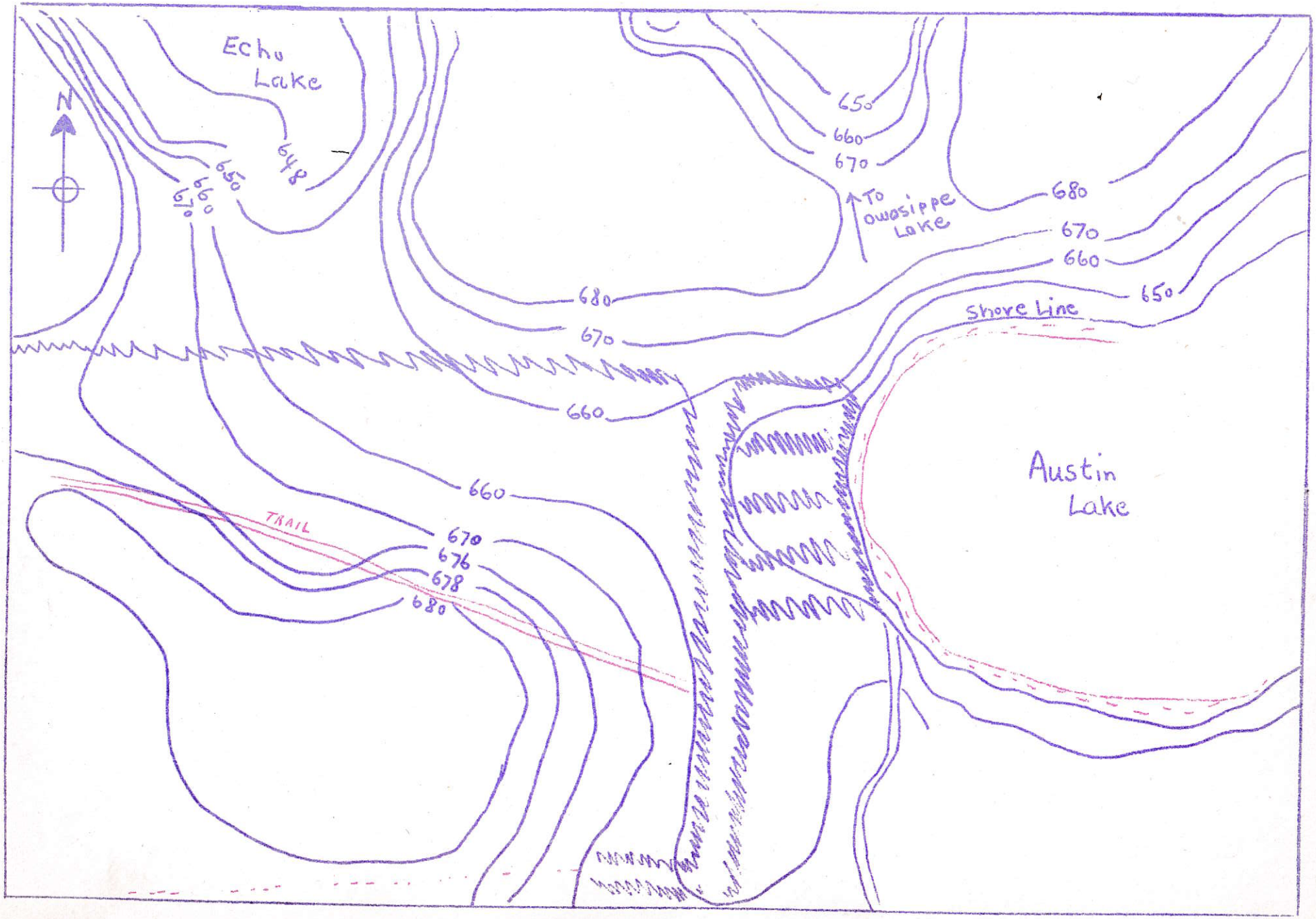
E. F. Schmidt-Naturalist



OWASIPPE NATURE MAP #1



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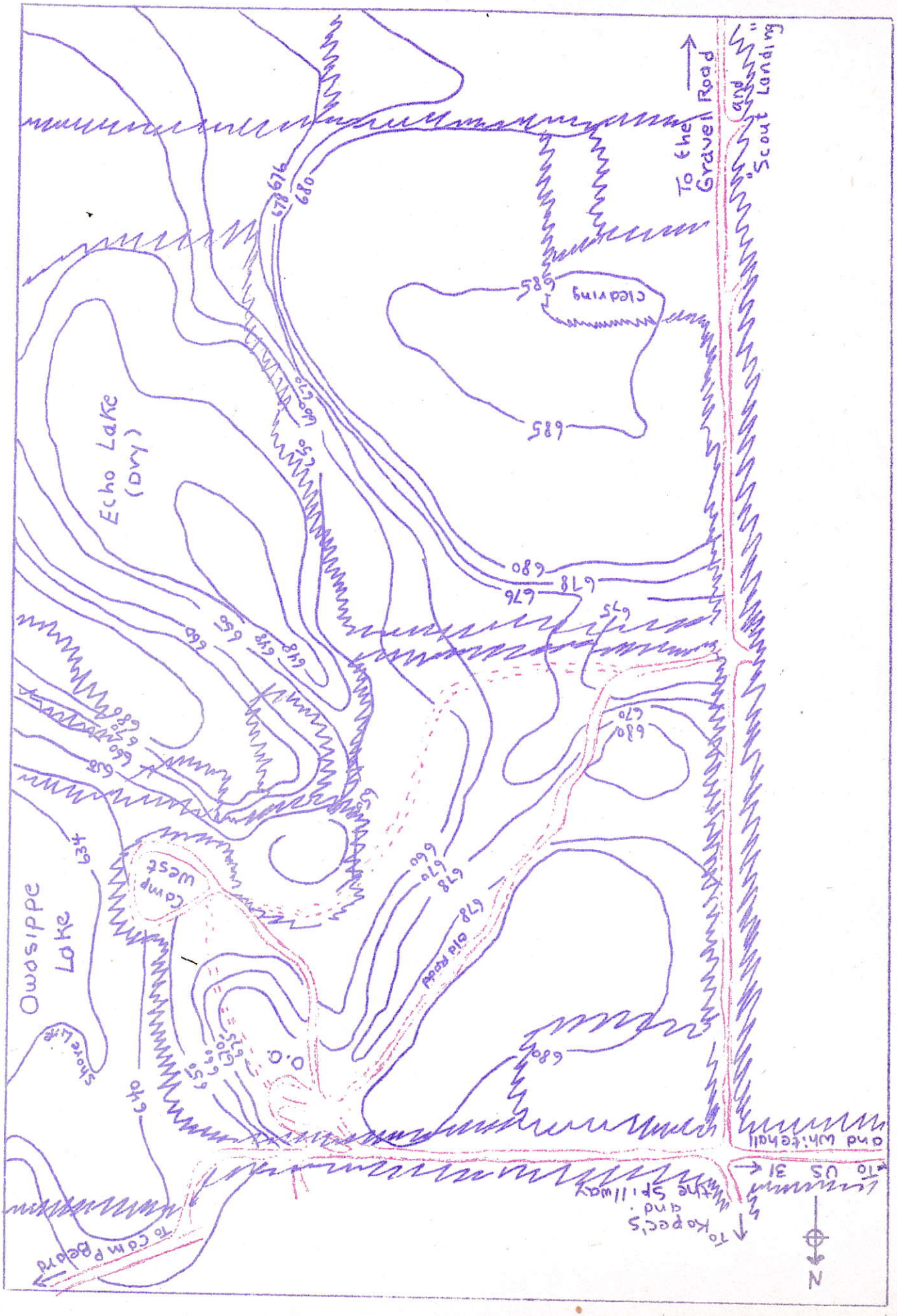

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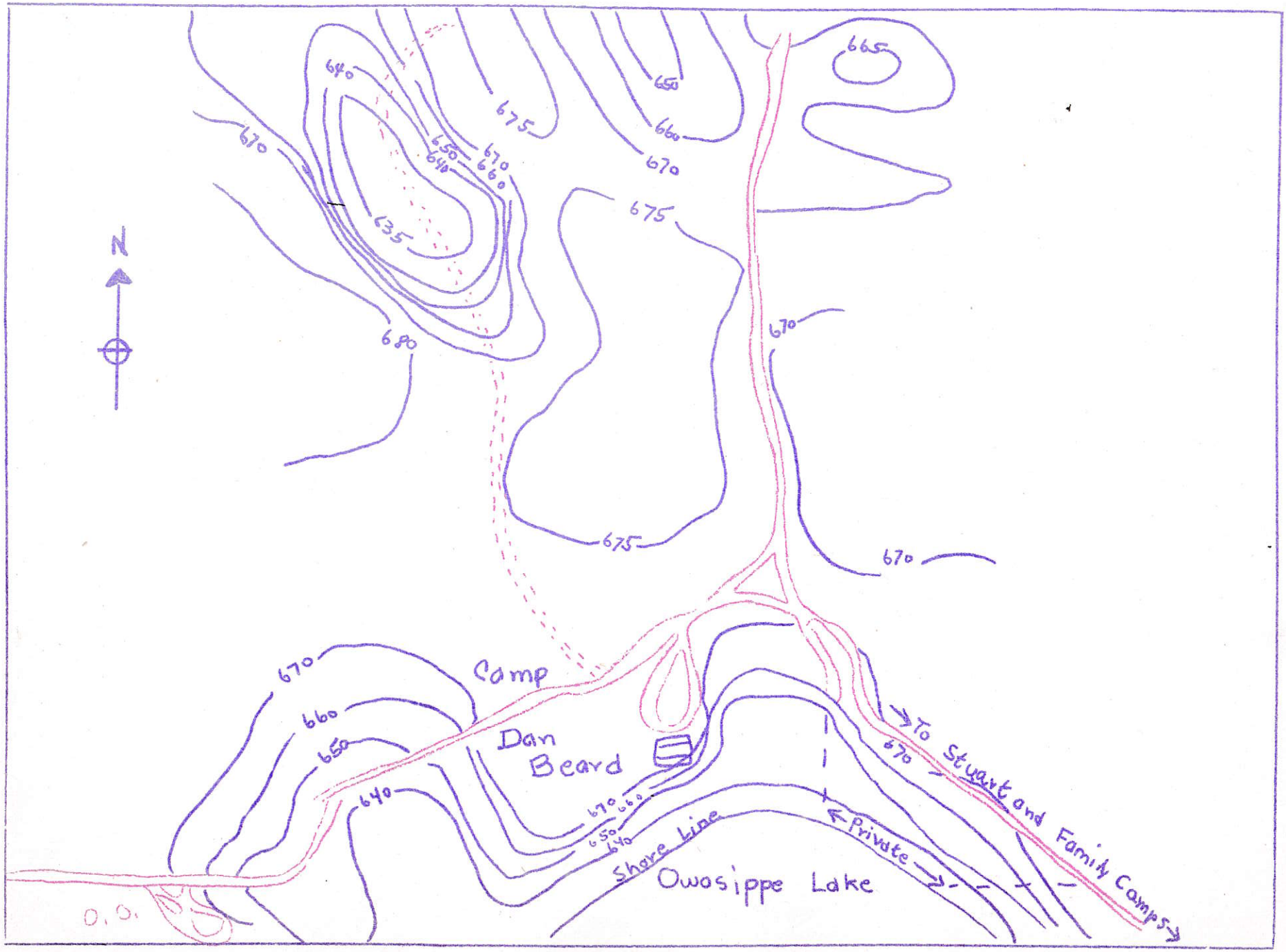

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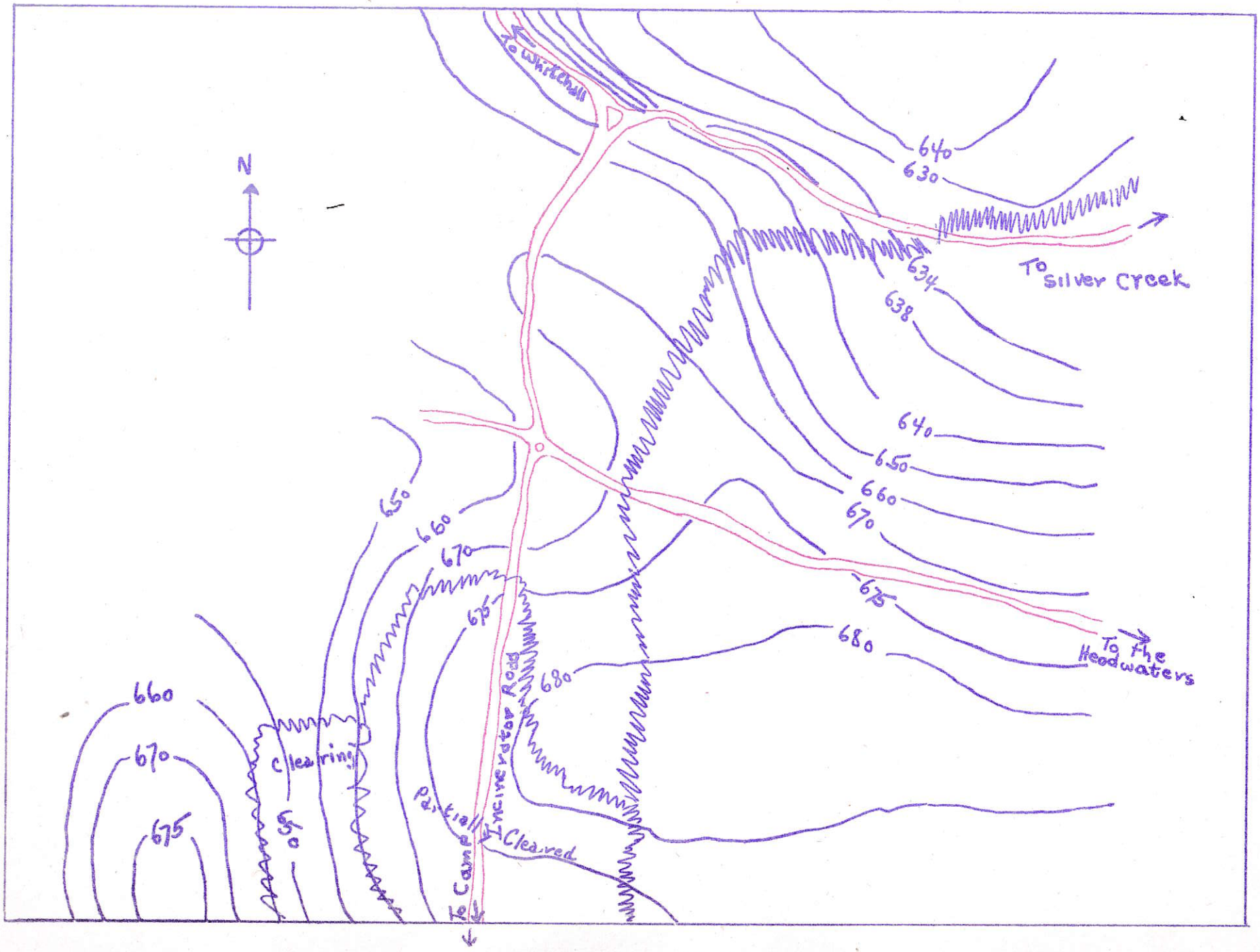
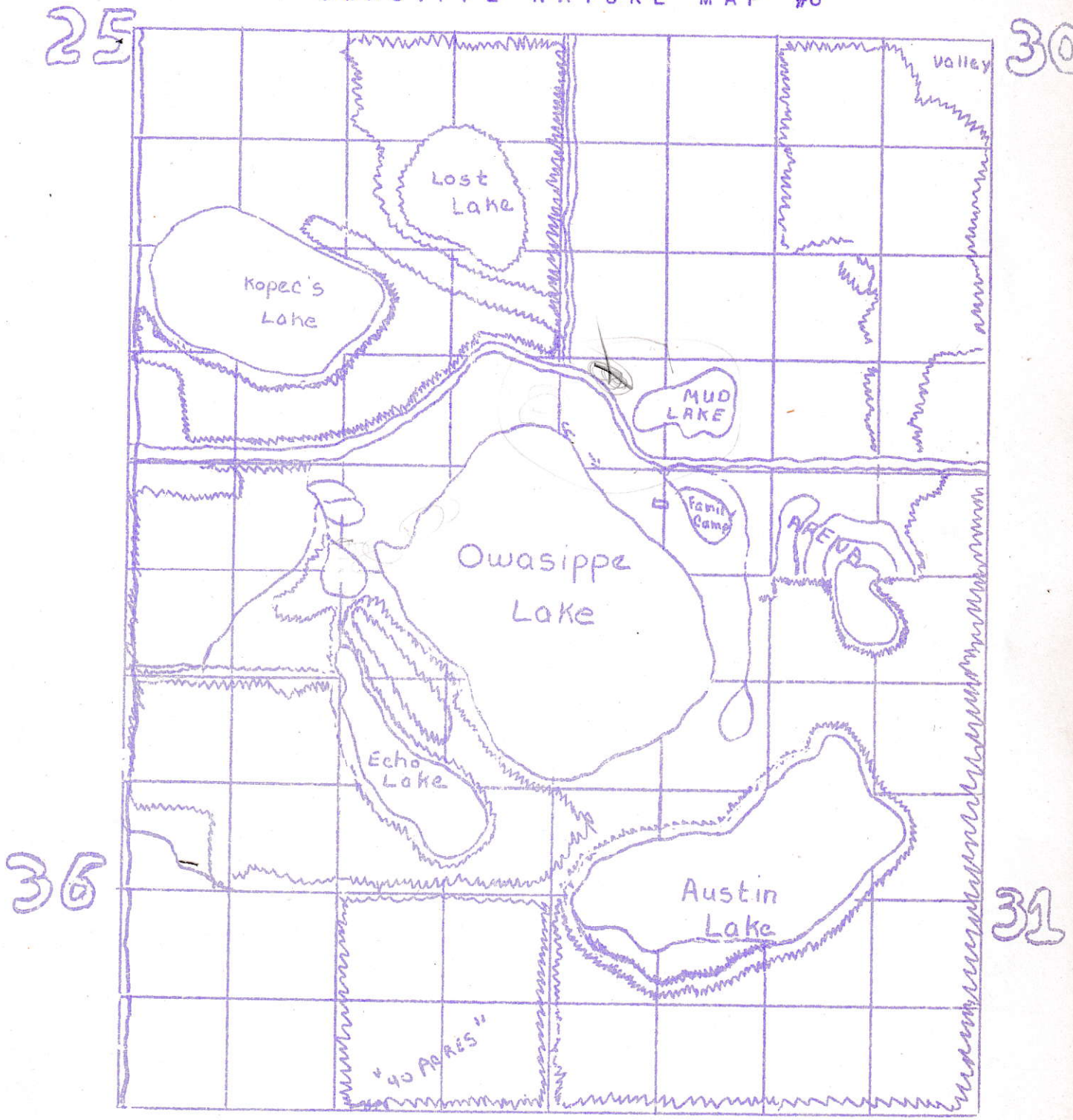


OWASIPPE NATURE MAP #5

OWASIPPE NATURE MAP #6



THE NATURE OF OWASIPPE REGION

Chicago Council
Boy Scouts of America

THE NATURE OF OWASIPPE REGION

In another report is a description of the origin and development of Owasippe Lake. This report and your observation indicates that one side of the lake receives the direct rays of the sun striking perpendicularly the surface of the ground. These rays came under the trees to dry the sandy surface quickly. So dry and desertlike is this region that the vegetation is remotely similar to desert distribution. Trees of many kinds range from those able to tolerate very dry conditions to such trees as can thrive and develop in moist, deeply shaded areas. In the former grouping are Jack and White pine, sassafras, black oak and white oak, in the latter are red oak, red maple and other shade tolerant species. With this introduction to tree societies, it is possible to arrange our trees as definitely as humans group and separate away from each other even though they live in close proximity.

It is possible to use a number system with the tree occupying a position as Pioneer assigned No. 1. Arbitrarily, the tree at the other extreme may be assigned No. 20.

Several plant groupings are made to cover the entire area. One of these groupings constitutes an arrangement of trees from Desert (No. 1) to climax (No. 20). What does climax mean? Climax trees are those assigned the highest number. They are the trees making up the final development in any region. Such trees succeed themselves. Their seeds can germinate in their dense shade. They are the trees producing the densest shade of all trees.

The many developments represented in this region are:

1 - Desert to climax (Around L. Owasippe)
2 - Swamp to climax
3 - Bog to climax
4 - Dry hills to climax
5 - River to climax

Very briefly these may be classified with No. 1 represented around Lake Owasippe.

No. 2 (Bog to Climax) in areas near White River with Tamarack and Arbor Vitae along with shrub birch and shrub willows as pioneers developing through red maple and yellow birch to climax forest.

No. 3 Swamp to climax - also along White River with peach willow followed by elms, alders, ashes, etc. to climax.

No. 4 Dry hills of hickory through walnuts and red oak to climax.

No. 5 River to climax with the pioneers dipping roots in the water, the climax trees ten or fifteen feet above the river. This is a long story of flooding and deposition showing trees in this order from 1 to 20.

1 - Black Willow
2 - Silver Maple
3 - American Elm
4 - Cottonwood
Swamp White O
5 - Sycamore
6 - Ash
7 - Hackberry
8 - 20 Linden
9 - 12 Walnut
10 - 12 Butternut
11 - 16 Mulberry
12 - 18 Red Oak
13 - 20 Witch-hazel
14 - 20 Tulip tree
15 - 20 Hemlock
16 - 20 Sugar Maple
17 - 20 Beech

Returning to the details of No. 1, the sandy desert to climax such as is shown around Camp Owasippe, Big Blue and others with even shoreline.

1 - Jack Pine
2 - White Pine
3 - Black Oak
4 - 8 Sand Willow
5 - 12 White Oak
6 - 12 Red Pine
2 - 6 Cottonwood
Aspens - Interlopers from swamp
8 - 14 Black Walnut
6 - 12 Butternut
12 - 20 Linden (Basswood)
19 - 20 Hard Maple
19 - 20 Beech
19 - 20 Hemlock
19 - 20 Tulip Tree
Alder Interloper
5 - 8 Juniper
14 - 15 Bluebeech
10 - 16 Hophornbeam
8 - 16 Juneberry
15 - 18 Red Oak
10 - 15 Bur Oak

Many conditions alter the arrangement. A much lobed lake will present in each lobe as many as three directional fronts. If lobes are close together an overlapping of vegetational groupings will make an analysis next to impossible.

Oak trees divide into Black Oaks and White Oaks. Black Oaks have leaf lobes of one or more points. White Oaks have rounded lobes. Black Oaks have pointed bud scales and pointed cup scales on the cup of each acorn. White Oaks have rounded leaf lobes, rounded bud scale and rounded cup scales on the cup of each acorn.

CLIMAX and near Climax Trees

At one end of each succession are the pioneers, at the other, the climax trees. In every case the climax trees are the same, in every case the pioneer trees are different.

What do we mean by a succession?

21,000 years ago Lake Owasippe had no trees around it. It was then a large cake of clear ice. The gravel, sand and mud laden ice surrounding the lake melted faster than the clear ice. (dirty ice always does melt faster than clear ice). Later the clear ice melted but deposited nothing because of its clearness, the dirt laden ice deposited the elevated shores to a thickness of many feet. So it was that Owasippe Lake came into existence in the later glacial period. Slowly plants found their way to the lake and its shores, with pines leading the succession as pioneers. From pioneers came other trees able to germinate in the shade of more pioneer trees. Black oaks are able to germinate in the shade of pines but not in their own shade unless there are openings in the forest where trees have died. Red Oak, Red Pine, Linden, Mulberry, and numerous others can germinate in the shade of Black Oak consequently wherever moisture content is sufficient Black Oaks are replaced by trees of nearer-the-climax type. A group of trees, able to germinate their seed in their own dense shade occupy a region. These are known as climax trees including in their numbers beech, hard maple, (sugar maple), hemlock, tulip, and sometimes linden (basswood).

It is interesting to observe that the sand succession ends with the above climax trees. The swamp, the bog, the river, in fact all successions in this region will finally arrive at a forest of climax trees composed of the ones named in the preceding paragraph.

CLIMAX VERSUS PIONEER TREES

The climax trees of every succession are always the same, the pioneers are always different i.e., the pioneers of the sand-like succession are very different from those of a bog or river succession. The pioneers of any succession beginning with bare dry sand are apt to be pines, those of a bog will certainly be tamarack or else arbor vitae.

BOGS

The study of a bog is very interesting but certain precautions must be observed. One of these - the presence of poison sumac, a tree whose parts are much more toxic than poison ivy. The leaf of poison sumac is compound with from 11 to 15 leaflets on the side of a central red-purple leaf-stem. The second danger in a bog is the treacherous footing. Commonly the surface of a bog is a mat of floating vegetation. To walk on it causes its surface to quake, to weave up and down. In places the vegetation is floating on water that is as much as from 6 to 20 feet deep. Although the danger of breaking through is somewhat remote, it can happen. A Roman soldier perfectly preserved, was removed from a bog in Germany 50 years ago. Bogs are intensely interesting because they contain the pitcher plant, sundew, sphagnum (Peat moss) and other peculiar plants. Sometimes a bog becomes a cranberry marsh and attains commercial importance.

Some bogs are at least a mile across with cranberries and highbush blueberry covering the surface. From such a bog are gathered many barrels of cranberries and blueberries. These bogs are commercial importance. Other bogs accumulate peat in beds several feet in thickness. The peat is removed, dried and used commercially as fuel and in greenhouses as fertilizer.

BOG TO CLIMAX

Near the mouth of the Little Flower river about 6 miles northwest of Whitehall is a climax forest covering the moist hillsides, the ravine depths. It covers the area back of the first high dune ridge away from Lake Michigan. In this forest are not only the climax forest of beech, sugar maple and hemlock but also remnant trees from a former forest. The remnant trees tell us the following story:

> These trees are Arbor Vitae and Yellow Birch, both bog trees. How can bog trees be mixed in an advanced form of climax forest? The answer can be only this: A thousand years ago the valley was a bog containing Arbor Vitae, Yellow Birch, pitcher plants, poison sumac, sundew, cranberry, bog blueberries and sphagnum moss. All but the bog trees have long ago died but they remain as a reminder that the time was when the entire valley was a bog. The time was when to walk here was to walk on a quaking surface, a mat of vegetation floating on water. Without presence of remnant trees, one could not tell the past history of the region. The forest, indeed, would be more typically of one type but certainly, far less interesting.

What about birch trees in this area? Between Camp West and Camp Stuart and about Big Blue are a few Red Birch trees. In bogs are yellow birch and occasionally in forests may be seen the paper birch. These are especially noticeable near the southwest end of White Lake.

For those interested in special studies, Lichens, Mushrooms, Mosses, Horsetails, Ferns and Clubmosses appear. These reproduce by spares, not seeds. Each Lichen is a combination of an alga and a fungus, the green or blue green alga serving as a food producing part, the fungus as a protector and holder of moisture. Mutually the two prove helpful to each other. Across the ages they have become so completely dependent, each upon the other, that the alga and fungus of their respective species must each have the other in order to live.

Our common lichens are of three types: Crustose, Foliose and Fruticose. Encrusting surfaces of rocks and other hard surfaces are the crustose forms. On the bark of trees throughout the forest about our lakes are foliose lichens. These plants grow on the bark of trees, especially on the north side or on the south side, if sufficiently shaded. The commonest of these is called Parmelia. Fruticose lichens extend upward 1/2 to 2 inches above the ground and are known by bright red tops — red - fruited lichens, by spire-like or finger-shaped finger lichens, by branching like reindeer-horns — reindeer lichens.

Because mushrooms have among their numbers two species which are deadly poisonous, they are commonly ignored. They include some dread forest diseases such as the fire fungus on our black oaks. Where axes have cut through the bark of oaks the spores have entered. Later, the oak may show large swelling and from these will appear the shelves with golden-brown surface, changing color as the angle of vision is changed. The parts seen are fruits, produced to scatter spored throughout the area. Trees are safe as long as the bark is neither cut nor broken. Bark is a perfect protection from this disease.

Peridermium produces a football-shaped growth two inches long, around branches or trunks of small trees. The tree, if small, is doomed.

Blackknot produce black knots on cherry, plum or peach trees. Only large trees can continue to live more than five years after this disease attacks. Here and there throughout our forest will be seen the gnarled, enlarged, and blackened dead branches on wild cherry and plum. The white rust has become scarse in these parts due to preventive measures practiced by the Scouting organization.

Hundreds of other mushrooms, soft enough to eat are not here discussed, because the subject is too extensive, the dangers are too great, and in sand areas two things are true; sand grains are commonly imbedded within them and the area is suitable forthe growth of our most deadly species - death cup and fly mushroom. The author of this treatise ate none of them until he had learned to recognize, with certainty, more than 500 species. He has now a record of 733 species eaten. Needless to say, that he has been able always to name with certainty every species he has eaten.

Mushrooms are of several forms - cup-shaped, (Peziza); disk-shaped, (Peziza) sponge-shaped on a stalk, - Morel; side saddle on a stem, Elvela; a shelf with pores beneath of three or more layers on a tree, - Fomes; a shelf of one layer with pores, - Polypore; A shelf with lower surface smooth no pores, - Stereum; and gilled mushrooms with white spores, with yellow spores, with red spores, with purple spores or with black spores. Our most poisonous mushroomsare white spored gilled mushrooms of genus amanita. A few mushrooms in this group every boy will see and wonder about are the ink caps with black spores which change to a mass of black fluid similar to ink, and the commercial mushroom, with purple spores, for sale in stores.

The coral-mushrooms of many colors are much branched, the stinkhorns begin as puffballs then shoot upward a club-shaped fruiting part 4 - 8 inches in height. Other puffballs range from 1/2 inch to several feet in diameter.

MOSSES

The cushion moss is easily known, especially the white cushion moss which may become a cushion three feet across and several inches in thickness. It grows throughout our forest. The crane's hill moss also called wind-blown moss because the leaves all point in the same directions as though wind-blown. The pigeon-wheat moss along the margin of our lake - south side - shows female plants, male plants, baby plants and spore-producing plants -- all in the same cluster. These are very common and readily recognized.

SCOURING RUSH

Your attention will be called to the bed of horsetails around the lake. These plants were collected by your great grandmother and used to scour skillets, teakettles and other kitchenware. The stalks contain silica, a very fine sand-like substance. Because of this use, horsetails are also called scouring rush.

FERNS

Ferns are of many kinds with the bracken fern and the cinnamon fern by far the most common. Bracken fern is called the weed among ferns.

OTHERS

Seed plants are too numerous to treat in this short work but many of them will be pointed out as the Scout roams the wilderness, walks along the lakeside or canoes along the shores.

MARL BEDS

The presence of a plant along the bottom of a lake, known as stonewort is of much interest because of the part it plays in the development of marl beds. Where it grows may also be seen great quantities of snail shells. The working together of stone depositing plants and animals eventually produces a layer many feet in thickness and contributes much to the filling in of our lakes.

Dr. Verne Ovid Graham
Camp Naturalist

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YOUR OWASIPPE LAKE

Nestling among the red pines and black oaks of west-central Michigan lies a circular lake, visited yearly by nearly a thousand Boy Scouts, and perhaps familiar to more people than any of the tens of thousands of similar lakes throughout the area of the glacial drift.

Across this lake toward the west, in late afternoon, golden tints from the sinking sun color the sky and the forest and the surface of the water, and with them comes a tranquility uninterrupted except for the occasional splash of a fish, the song of a harvest fly, or the cheerful call of a song sparrow. During the early morning, when shades of blue predominate in the sky and water, a lonely heron may laboriously tread the air and cry out as if to lament some tragedy of which we can but guess. Summer evenings and summer mornings colored and flavored by such conditions have been many; for a thousand years, yes, for man, thousands of years, such crystal-clear lakes, fringed by the forest, having been the setting for the play of delightful colors and for the annual pilgrimages of feathered life.

Owasippe Lake is bordered by white pine, red pine, and black oak on a rise of the shore from twenty to fifty feet above the water. The slanting rays of the sun strike the north shore and hillside more or less directly; their heating and drying effect is here much greater than elsewhere. By contrast, the heat rays shine over the shore elevation along the south side of the lake on an angle so low that much of the heating and drying power is lost. The contrast of the two shores is intensified by the shade of the trees on the high marginal hills.

Toward the northern side, Owasippe Lake is very deep. Plant life is present in the water but is made up of widely separated forms, and consequently the accumulation of deposition is relatively small. The south side of the lake is shallow; much plant life forming almost solid associations is the rule and the accumulation is great. Here the evidence indicates that such depositions have occurred for many years. The lake bottom is of soft humus and mud, overlaid by shallow water through which emerge bulrushes and cattails. Here boating and swimming are conducted with difficulty.

The north shore is constantly dry, sometimes almost desert like, with little plant and animal life and but little deposition in the water. The lake here, therefore, is very slowly changed, if at all. The south shore is moist and shaded, with much plant and animal life and from this life there is much deposition in the water. Is it any wonder that after several thousand years the two sides of the lake have come to differ greatly? Were this description true of this lake and of no other it would be of small value, but add the story of ten thousand other lakes affected by the same conditions and a basis for an understanding of all of them is established.

The story of Owasippe Lake, covering more than twenty-thousand years, is the story that might be told of many others, with minor modifications due to the position of outlet or irregularity of outline containing bays, peninsulas or large lobes in the shore contour. This is the story of how a great and powerful heavenly body, the sun, forces heat and light upon the earth, of how the powerful energy radiating in straight lines is far greater when received perpendicularly than otherwise, of how the south-facing slope on the north side of the lake is not only without shade but in addition receives the maximum light and heat, of how the north-facing slope is not only shaded by

the fringing forest but receives what sunlight comes to it on an angle. The south face is usually of low moisture content; the north face is always moist, contains vegetation much of which approaches a climax association, but the pioneer stages are much in evidence on the opposite shore. Add to all this the multiplicity of animal life present where the vegetative growth is dense, and the total picture takes form.

No doubt, the reader already has formulated the question: Is it correct to speak of south and north when in reality the sun's heat is greatest one or two hours after the noon hours, when the sun is 15 to 30 degrees west of a true south? The evidence shows the center of the greatest deposition and of greatest plant growth in the lake to be somewhat to the west of south, and the reverse condition somewhat to the east of north on the other side of the lake.

During cloudy, misty or rainy weather, one lost in the north woods may look for some way to determine directions. He may search for the green growth of Plouroccocous on the north sides of trees only to discover that the forest has produced a shade so uniform that such greenness is on all sides of the trunks. He may again be foiled when evidence of greater growth of trees on the south side is sought, for again density of the forest prevents differentiation in amount of north and south lighting. The lake, on the other hand, is large enough to permit directional evidence always to be present. An understanding of the development of these lakes may well be of value in other ways. Should you desire to introduce some humor when your friend invites you to visit him in his north woods cottage on Bear Lake, ask him why his lake is so much deeper on the north than on the south side. He will no doubt come back with the counter question: "When did you visit my lake?"

An understanding of lakes may also lead you to build your cottage on the side where swimming is good and leave the other side unmolested for your enjoyment, for walks among nature's bountiful production. Your cottage will then be placed where vegetation is sparse. The lake bottom is good for wading and swimming and the boat may be launched for a row without oar-entanglement in hornwort, bladder-wort, pondweed and water milfoil. You can sit quietly on the beach during early morning or late afternoon and listen to the "stake driver" (bittern) as he pumps his head up and down while emitting the peculiar sound similar to the driving of a stake into soft mud, or with field glasses peer across the lake and watch herons, ducks and numerous other birds at their feeding grounds.

More than 25,000 years ago, with the melting of the ice, many depressions resulted in the formation of numerous lakes. Some were deep and round or irregular in shape, others were shallow and subsequently have been reduced to marshes or prairies, but each and every one of them has undergone changes much as described in the preceding paragraphs. Some have been further modified by their outlet, some by lobing of their contour, which created north and south faces at many points with the consequent merging of the deposition into adjoining areas. The story of such lakes involves several factors and is very much more complex than for a circular lake.

Until you have had time to re-examine some of the lakes you visit often, let us hope that the foregoing will arouse some curiosity for pondering and wondering, and especially for anticipation of your next visit.

(Taken from the article entitled "The Chicago Naturalist" in the Chicago Academy of Science--Vol. 3 No. 1 - April, 1940 issue).

8/31/53 - 100

by Verne O. Graham

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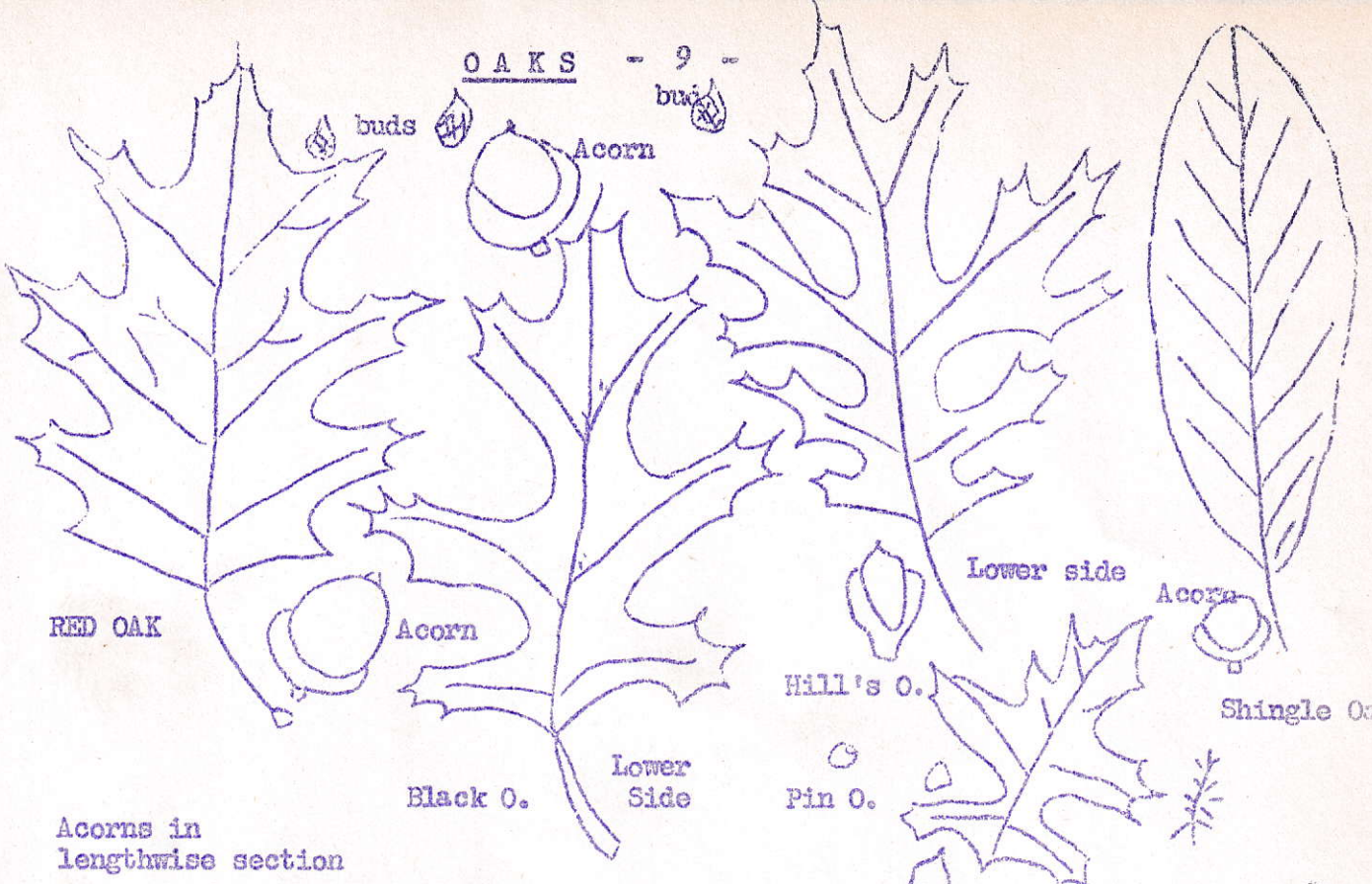
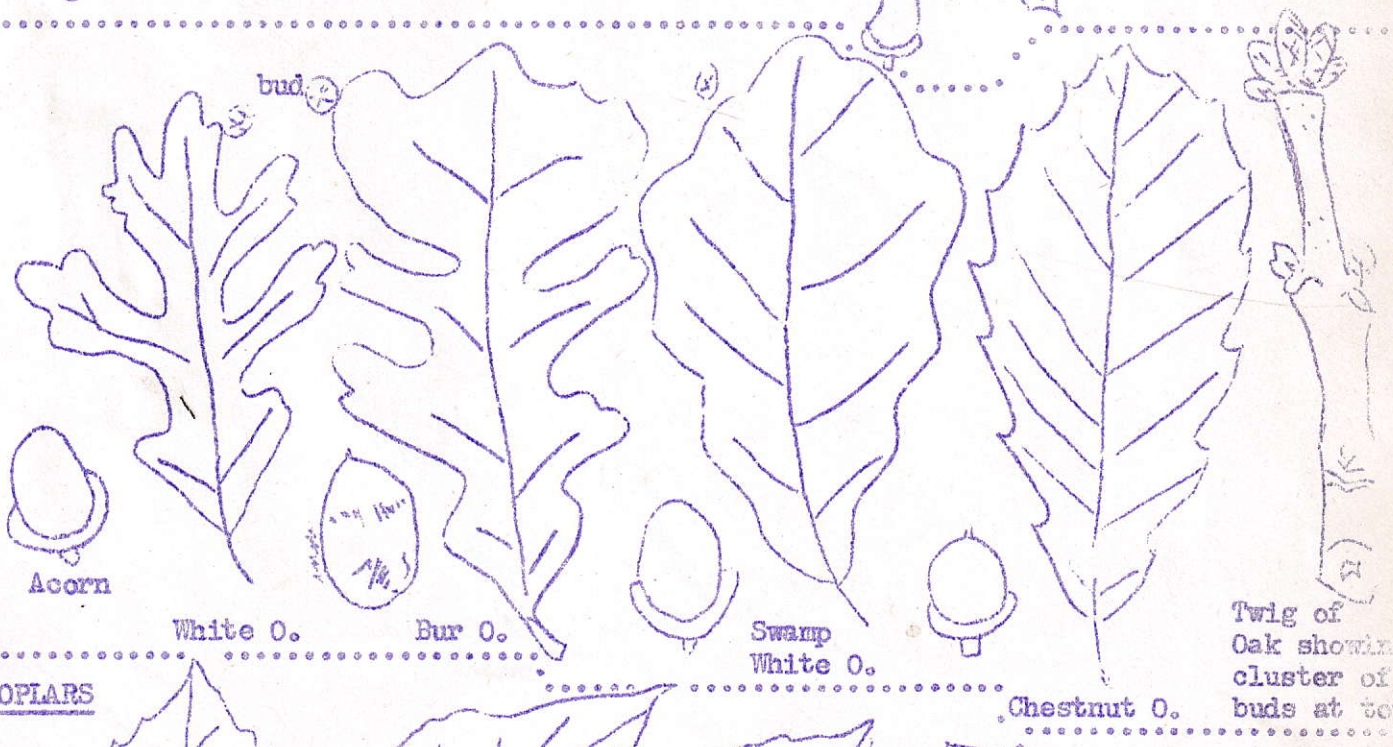
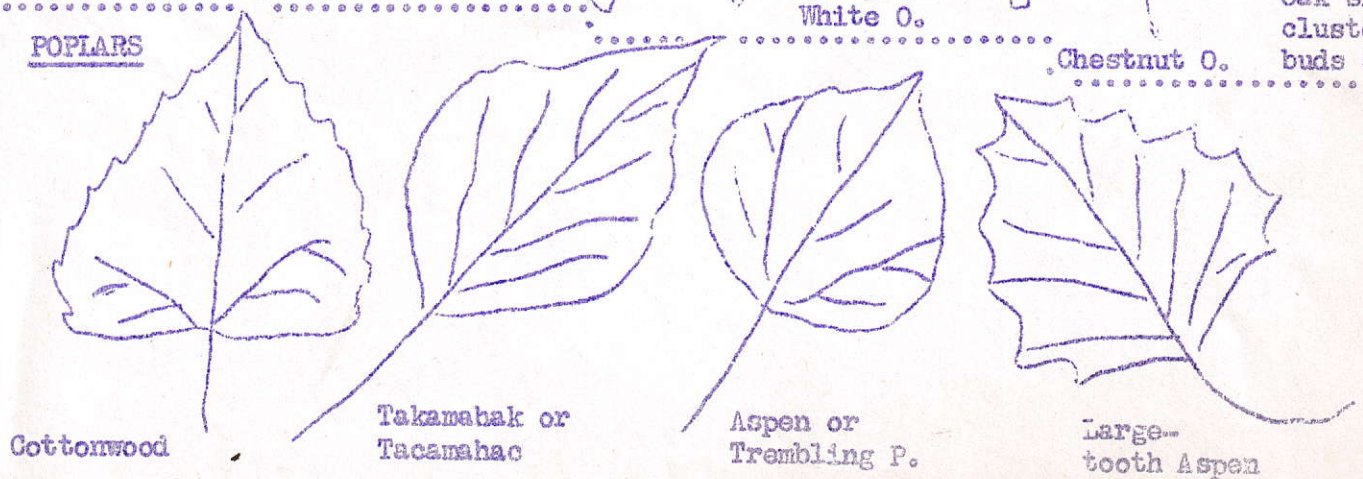
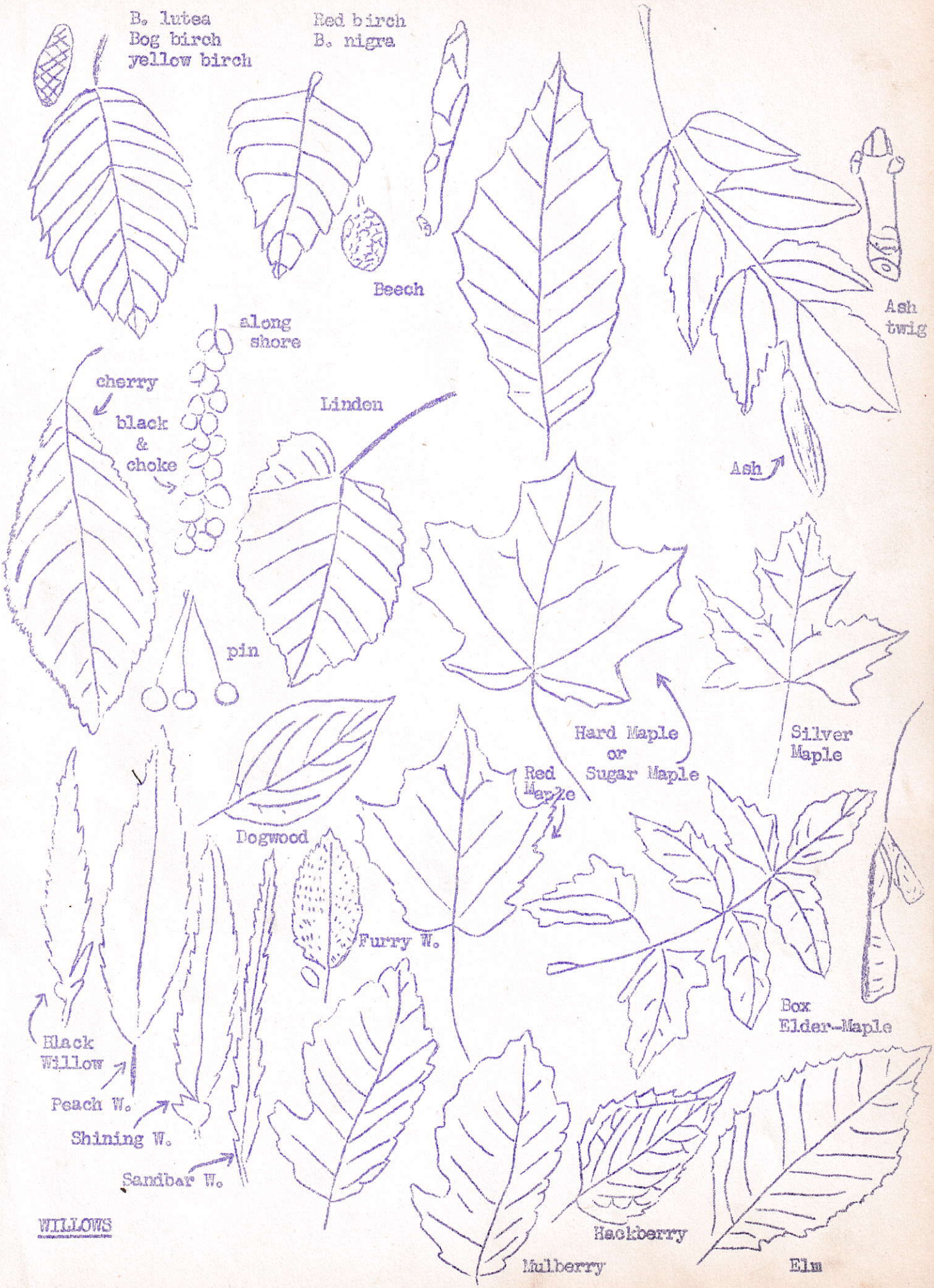
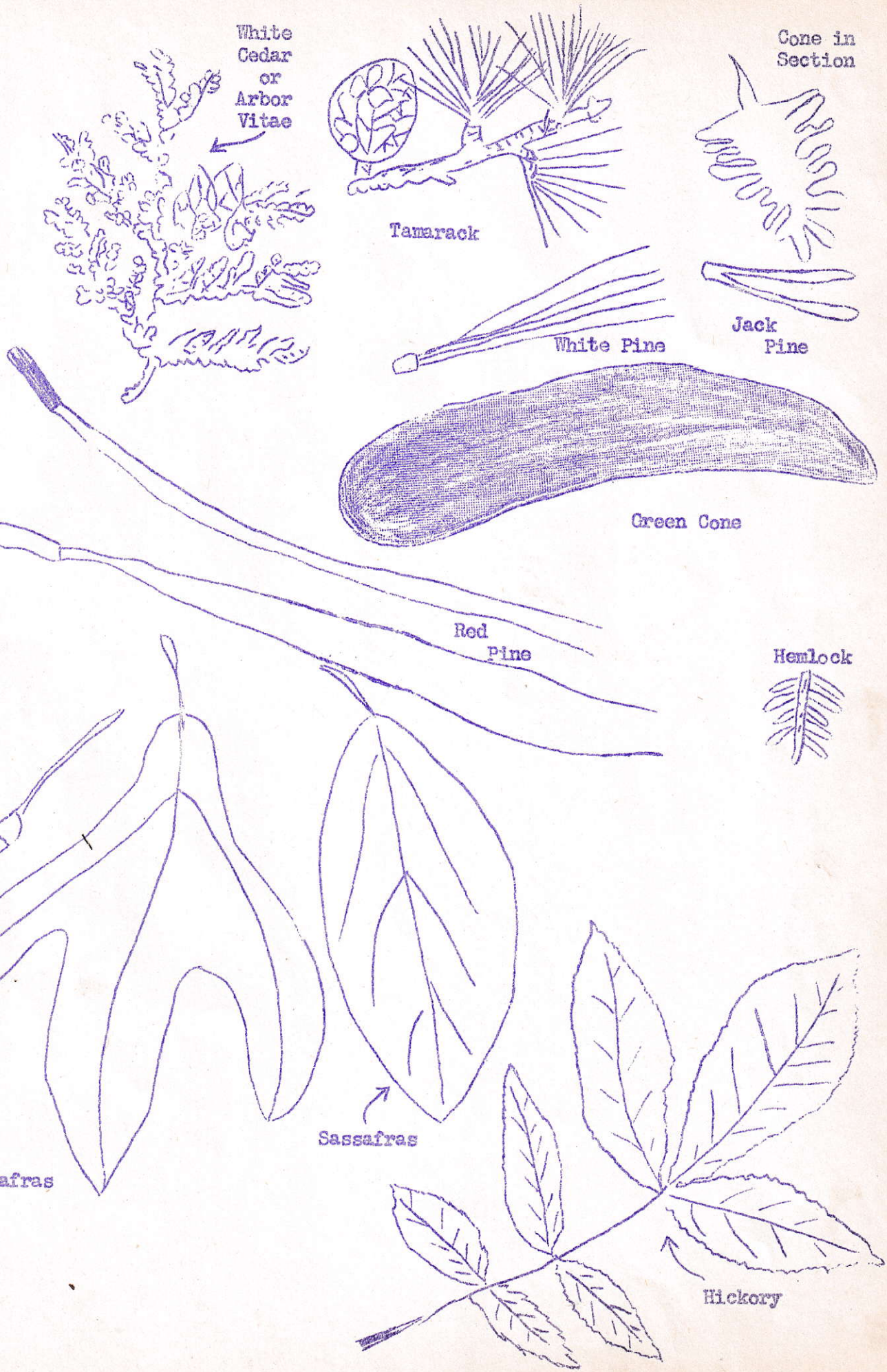

buds
Acorn
bud
RED OAK
Acorn
Black O.
Lower Side
Acorns in lengthwise section
Lower side
Acorn
Hill's O.
Pin O.
Shingle Oak

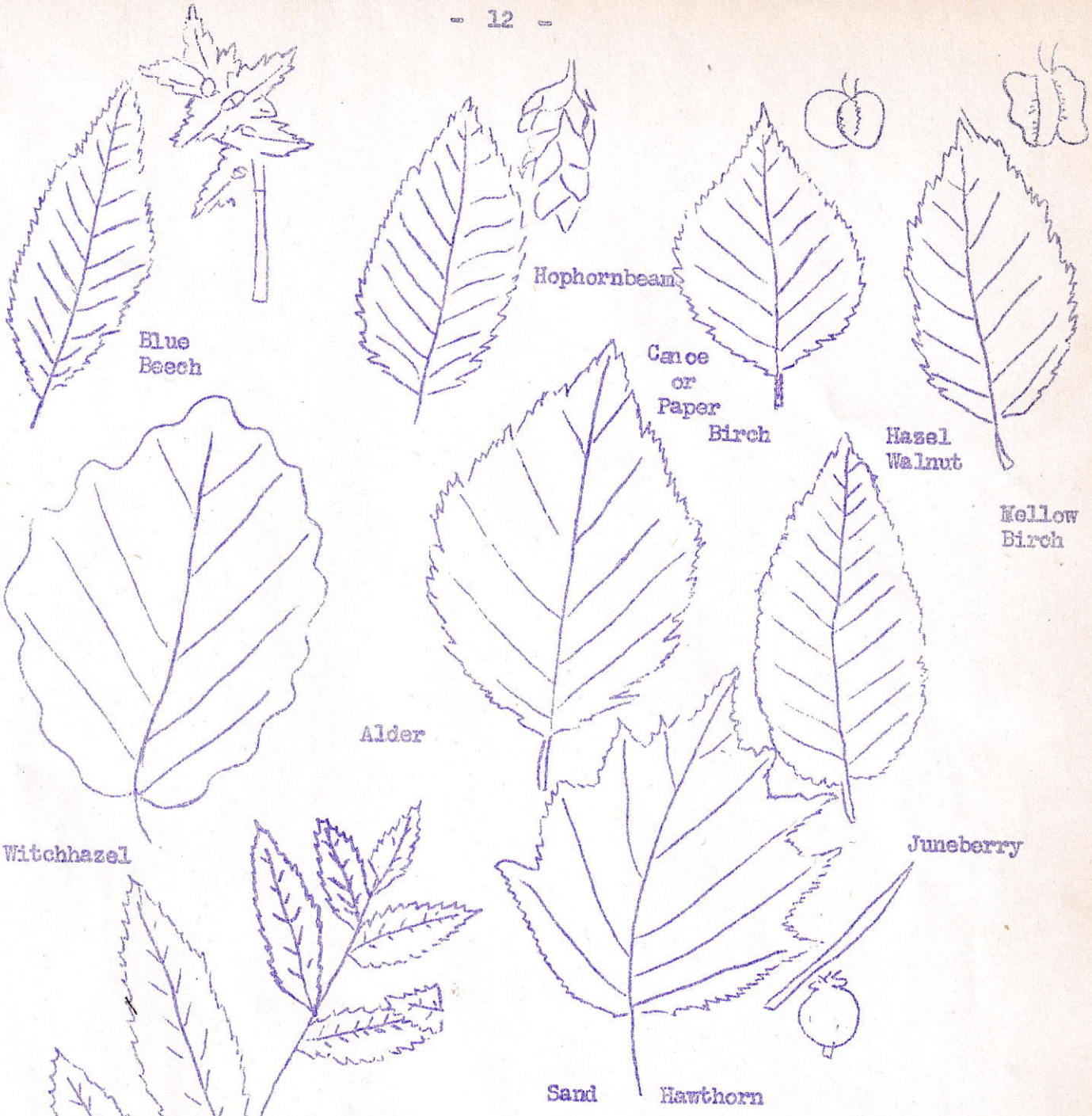

bud
Acorn
White O.
Bur O.
Swamp White O.
Chestnut O.
Twig of Oak showing cluster of buds at top

POPLARS


Cottonwood
Takamahak or Tacamahac
Aspen or Trembling P.
Large-tooth Aspen


B. lutea
Bog birch
yellow birch
Red birch
B. nigra
Beech
Ash twig
Ash
along shore
cherry
black & choke
Linden
pin
Hard Maple or Sugar Maple
Silver Maple
Red Maple
Dogwood
Furry W.
Box Elder-Maple
Black Willow
Peach W.
Shining W.
Sandbar W.
WILLOWS
Hackberry
Mulberry
Elm


White Cedar or Arbor Vitae
Tamarack
Cone in Section
White Pine
Jack Pine
Green Cone
Red Pine
Hemlock
Sassafras
Sassafras
Hickory



White Walnut has a longer, more slender nut.

The White Walnut is often spoken of as Buttermut.

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ALONG THE WHITE RIVER

Canoe trips traverse a distance of many miles from Taylor bridge down the White River to Whitehall, Michigan. Along these miles appear a variety of plant and animal associations. These are not closely comparable to those of the circular Lake Owasippe with its green shore along half of the circumference across from a bare sand shoreline of the other half. This river presents a varied region of high banks and low banks of wooded areas and of non-wooded flats.

High banks rising from the margin of the river for 100 feet are not unusual. Other banks one foot, three feet, ten feet, or other heights, are of common occurrence. Each of the types of river bank carries with it a unique story of growth and development. Low banks of one or a few feet with a background of level ground portrays the usual river succession of trees with black willow (Salix Nigra) fringing the water's edge, silver maple averaging a few feet to the rear on slightly higher ground, followed by numerous other trees. This may be expressed simply by a number system in which black willow is assigned No. 1, silver maple No. 2, white ash No. 3, elm No. 4, etc. This number system covering this area may be arranged as follows:

No. 1 - Black Willow

2 - Silver Maple, Sycamore

3 - White Ash

4 - American Elm, Red Elm

5 - 20 - Linden

6 - 14 - Walnut and Butternut

18 - 20 - Extreme mesophytic trees such as Sugar Maple (Acer Saccharum), Hemlock and Beech.

Several other trees appear with numbers between 5 and 19, each spreading across some width of tolerance to varied environmental conditions.

ALONG THE WHITE RIVER - continued

The above tree succession is apparent only where the river banks are low, the same order from (1-20) appear up the slopes, for example, if a bank is three or four feet high above the waters of the river, there will appear on it trees from No. 4 to 20. In this case, water is constantly draining downward and outward to moisten the surface, leaves are accumulating humus from year to year and the forest shows an intermediate development.

High sloping banks (slope of 20° - 30°) have a well-developed forest dominated by hemlock, beech and sugar maple, with red oak (12 - 18) maintaining a prominent position. Near the base of such cool banks Arbor Vitae appears prominent. Such a bank is far on the way toward mesophytism.

To clarify the term mesophytism, the word may be spoken as referring to a forest grown old, or one fully developed, or having reached a stage where no more changes occur, or the highest type of forest the climate will support. A hillside due to a landslide may change from a mesophytic forest to a barren slope and the developmental stages are renewed. After several centuries the mesophytic forest will appear again. Along the river there are many places where logs have been rolled down slopes into the river. Each of these has produced a bare surface and each bare surface will require centuries to become stabilized and to again develop to a mesophytic forest.

Everywhere along the river may be seen ice beaches. During winter ice freezes to form a layer across the river, a layer becoming very thick in places as the weather becomes increasingly severe. Ice is of greater size than the water from which it is frozen, thus expanding ice pushes into the shore forcing upward the shore earth. Often the force is exerted beneath the shoreline trees loosening the root system on the side toward the water. With the thaws of springtime, the trees tend to fall in the river, but their root system shoreward is strong enough to maintain them in an inclined position. Year after year this process continues with tree after tree falling across the water .

ALONG THE WHITE RIVER - continued

The perpendicular banks of White River, mostly of a type rising 6 to 10 feet above the water level, contains two features: first, trees upset by ice pushing beneath their roots, and second, by an advanced development of trees in contrast with the group found on low river banks near the water level. Near water level the banks contain willows, sycamores, and elms; higher banks contain various trees graded by drainage conditions. A bank six feet high or a gradual slope may contain such mesophytic trees as hemlock, beech, linden and hard maple (sugar maple). Among them are numerous bushes: witch hazel, spice bush, and many others.

On a high, perpendicular sandy bank, 20 feet or more above water level occurs pioneer trees, a group of white pines. From this high bank the terrain slopes away to a slightly lower level containing a pine-oak forest with appropriate undergrowth of herbs and shrubs.

Behind many of the high ice beaches are low swamp areas. Some of these contain arbor vitae and tamarack bogs, others are fens with high fen grass (Calamagrastis Canadensis) and some red canary-grass (Phalaris Arundinacea).

Down the river within a few miles of its entrance into White Lake the shores are fens. Here during August, 1948, a red maple in full fall coloring leaned over the river at an angle of 45°. On three sides of it, but not leaning were other red maple trees showing none of the red coloration. The brilliant red of one tree indicated its precarious hold on life with three-fourths of its root system below water, the other fourth anchoring the tree in the bank of the river.

In the bay where docks the White Lake pleasure boat, great quantities of the smallest of all flowering plants (Wolffia) are washed up to form a beaded mat of green. An examination of these minute plants each shaped like a football one-thirtieth of an inch long, shows a small depression in each where the minute flower is produced.

ALONG THE WHITE RIVER - continued

Added to the experiences encountered in canoeing, passing log jams, scraping over underwater logs, seeing schools of red horse or the more hidden trout are numerous variations of plant associations each bearing a wide variety of insect and animal life. These are encountered by every Boy Scout taking the trip by canoe down the White River.

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